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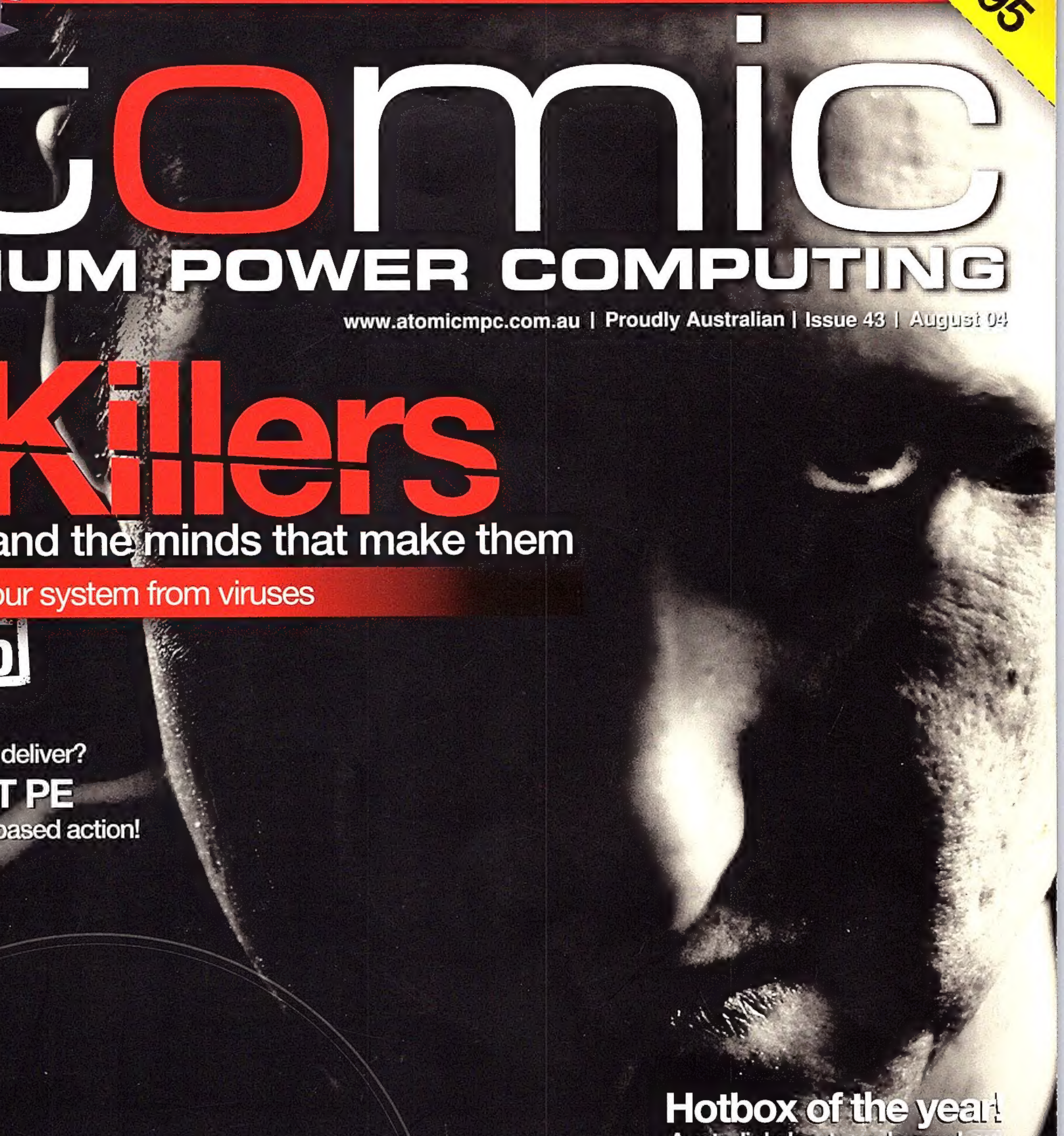

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Inside viruses and the minds that make them

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**Gigabyte X800 XT PE**
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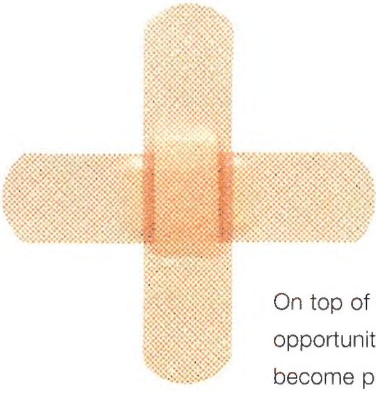

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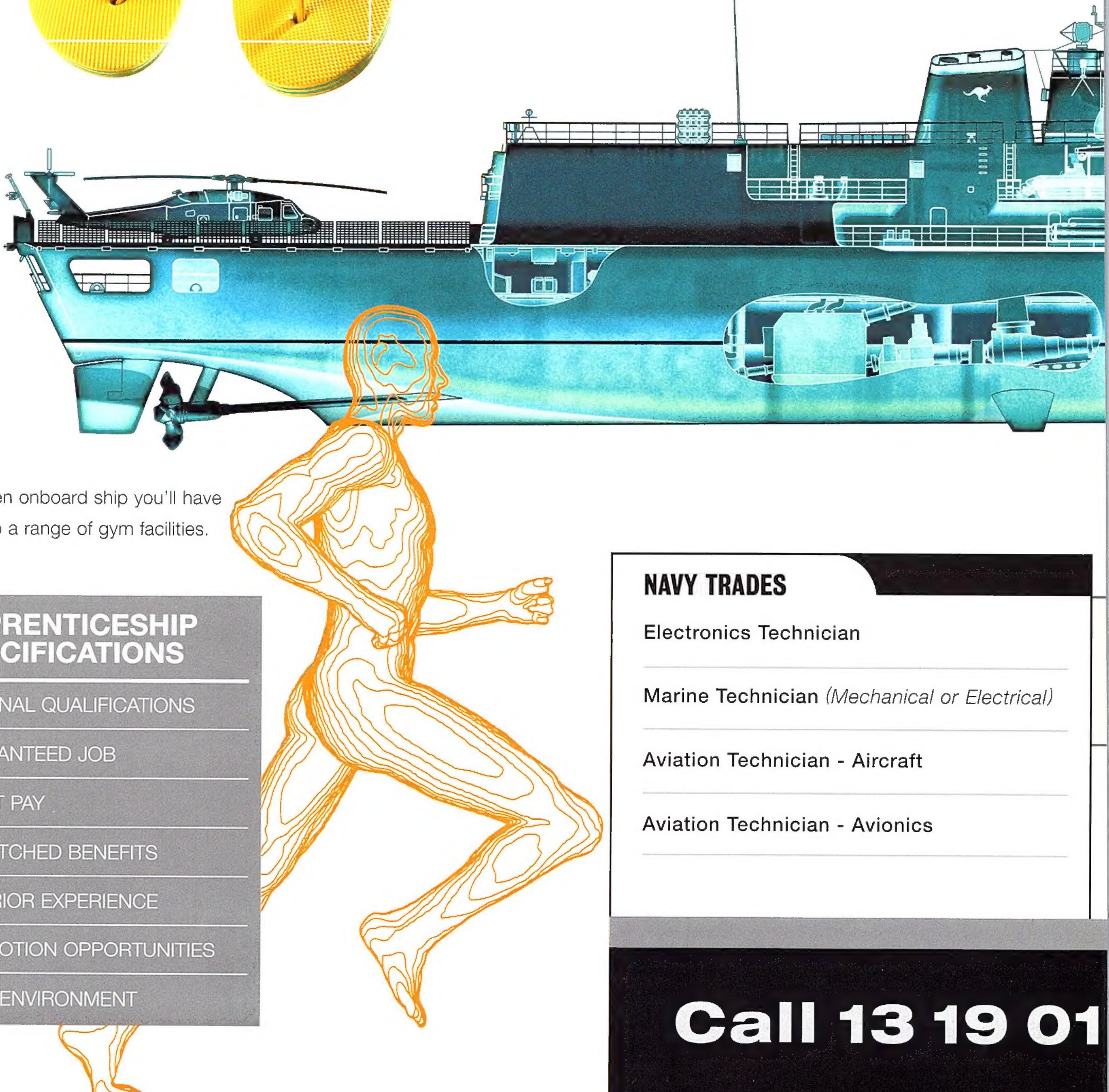

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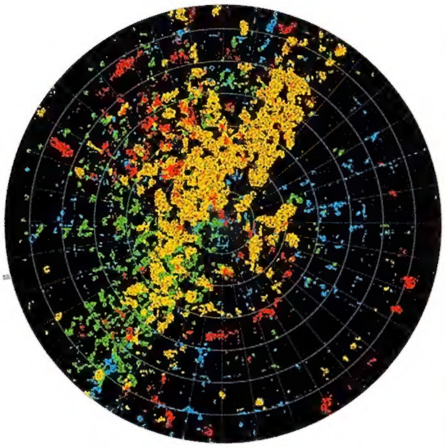

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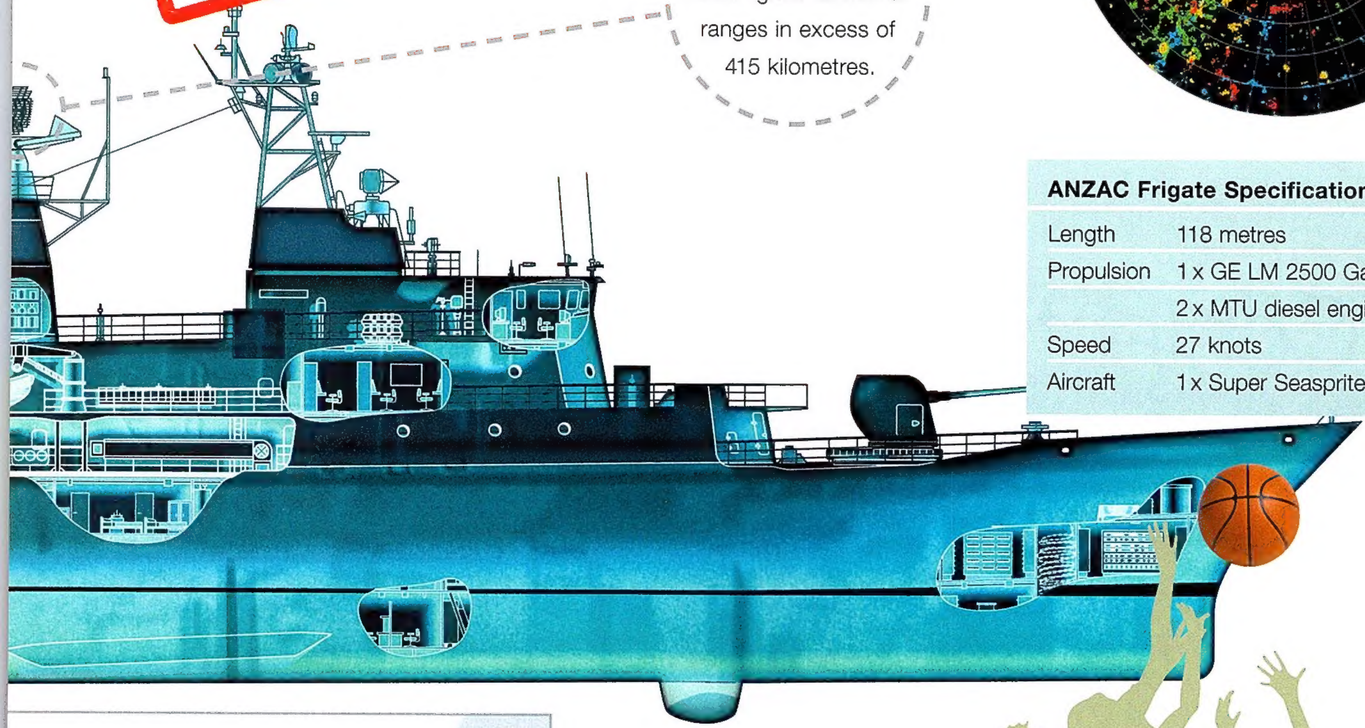

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August **2004**

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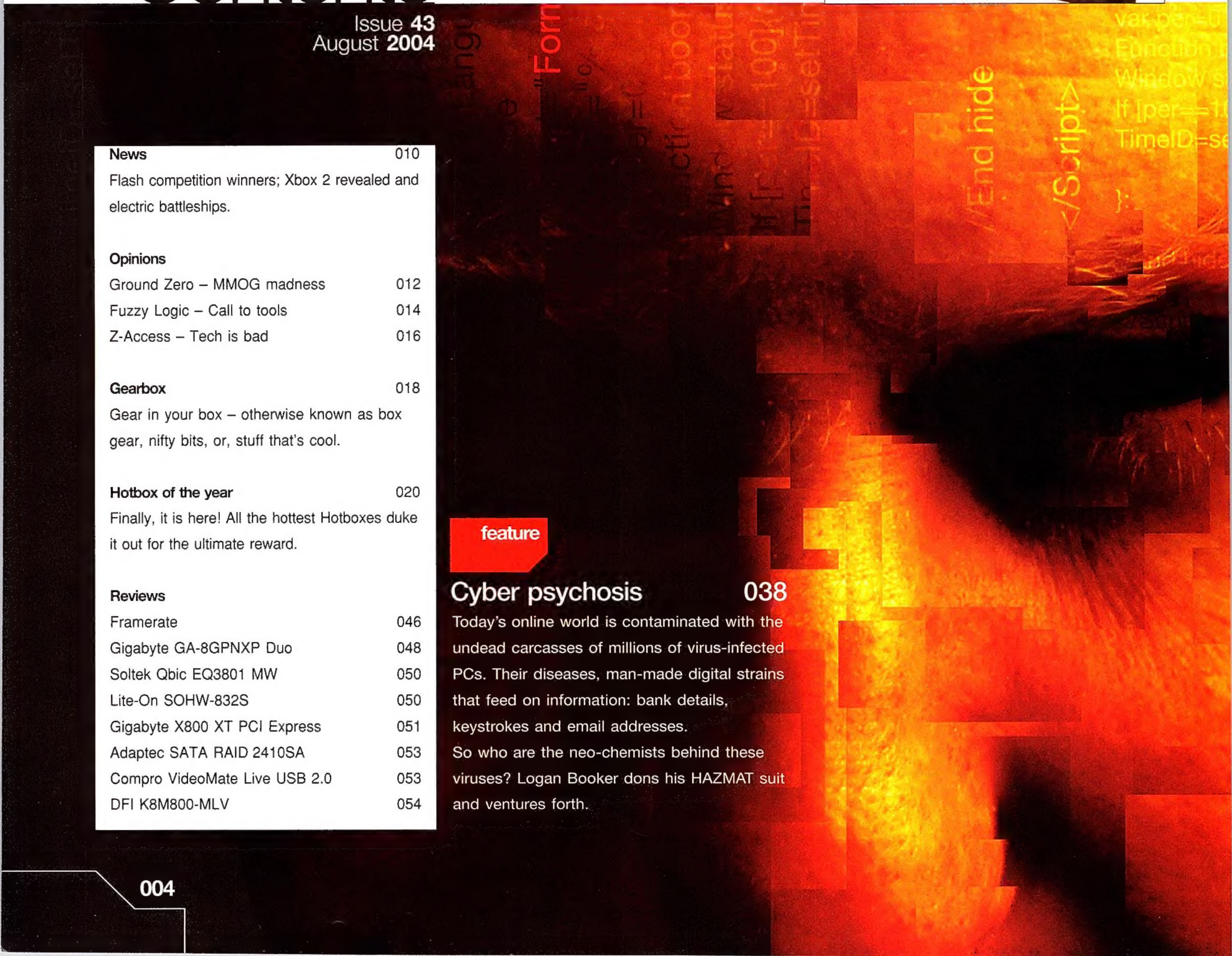

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Today's online world is contaminated with the undead carcasses of millions of virus-infected PCs. Their diseases, man-made digital strains that feed on information: bank details, keystrokes and email addresses.
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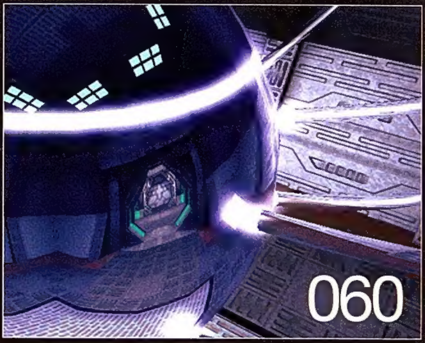
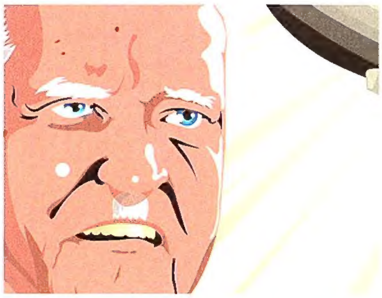


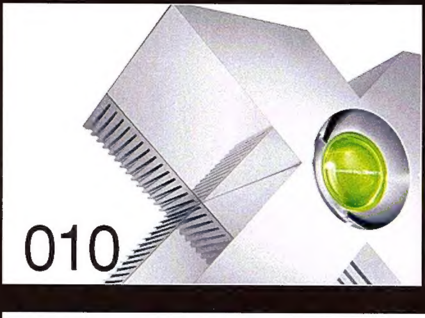


### x-ray DRM 025

Crap. Stupid. Unnecessary. Dumb. Pathetic. Ridiculous.

Call it what you want, but Digital Rights Management is here to stay. It's a part of Windows, numerous media formats, as well as a bunch of other things we're likely not aware of yet. More than once, it's taken a sizable chunk out of our derrieres, and no one likes to be missing parts from their, er, back end.

It's a good thing then that Daniel Rutter is here to explain the ins and outs of DRM. Maybe it does suck... but then, maybe it doesn't. Let Magic Dan fill you in on everything you need to know, from your copy-rights to the reason why your WMA files just won't play.

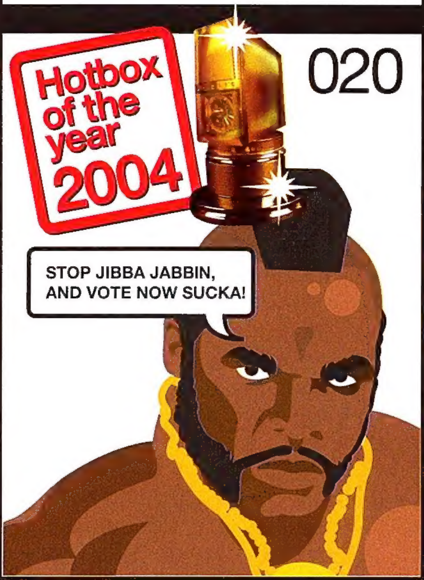


### feature Computex 2004 034

Welcome to Computex – otherwise known as Taiwan's almost mystical festival of high-tech, mega-hot hardware.

By hardware, we mean anything that has an electronic component. This includes motherboards, video cards, MP3 players, storage devices, robots, super-thin TFT screens, as well as a bunch of other unclassifiable gizmos, gadgets and wing-zings. Yes, wing-zings.

We fired John Gillooly over to the promised land in a giant rubber slingshot, so he could report back to us on all the wondrous stuff he found. How he got back is another story... and it's nowhere near as exciting as Computex.


Hotbox of the year 2004
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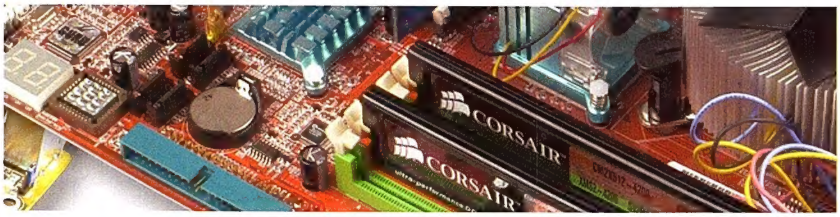
STOP JIBBA JABBIN, AND VOTE NOW SUCKA!



### head to head PCI Express 028

It's PCI Express against the rest. The rest being PCI, PCI-X and AGP – plus whatever else lurks beneath the surface of today's mixed bag of standards. Trying to understand the meaning behind these terms and phrases, expressions that change in scope and pronunciation almost every month, can make life more complicated than it needs to be. Riding in on his horse, of course, John Gillooly takes to PCI Express with his Jousting Lance of Wordy Order. Let him explain it to you in his nice, bear-like voice.

# Forever Atomic

Welcome to *issue 43*. This is an important milestone in the history of *Atomic*. It's been three and a half years since *Atomic* first shed its dazzling brilliance upon an otherwise dry market of IT publications.

And look how far it's come.

Back when *Atomic* was but a mischievous glint in Ben Mansill's eye, he knew there was a void waiting to be filled – a magazine, and even a home, for the intellectual, the enthusiast, and the just plain curious among us. The type of people who don't just love to learn about technology, but *play* with it; not just understand it, but to *explore* it. This is what it has always meant to *be Atomic*.

Since then, *Atomic* has grown into not just a guiding beacon for the latest and greatest in technology, but a powerful bastion for it as well. It has become one of the finest magazines in Australian publishing – now officially recognised recently as the Best Technology Title for Professionals and Enthusiasts – and between the magazine and website (www.atomicmpc.com.au) has also brought together a community the likes of which competing magazines can only fantasise about.

So it's a privilege to be here and take over the reigns of *Atomic*. Ben is still around of course – he now lends his extraordinary enthusiasm and passion to the online domain, but you'll still find him in these hallowed pages offering up an opinion in the columns. Go and read it now (*page 14*), I daresay it's *Atomic* in its most pure and serene form.

For my first issue at the helm we decided to do something different – a mean-ass portrait on the front cover to procliam *we are here and we are hardcore*. That, and draw attention to Logan's excellent virus feature on *page 38*. John's PCI Express feature is also platinum-plated gold on *page 28*, and can't be missed.

We've also done a little house cleaning, a few pages shifted here and there, and added a bit more humour at the back with a new section called Lost In Translation. Let us know what you think!

Speaking of which, I couldn't ask for a better team. John, Logan, Nathan and Tim are a well-oiled genius machine in perpetual operation. Together we form an *Atomic whole* so complete that I daresay the sun itself is jealous of our light.

This is an awesome age for *Atomic*. Once upon a time the mass of mainstream IT titles scoffed at our hardcore content, but now they tread where *Atomic* has led. And we'll continue to lead, charting the waters *Atomic* established in the first place – a belief, passion, and absorbing addiction to technology and the world it creates. Wherever it takes us we will be there. We have always been there.

I'm proud to be a part of it, and with what we've got planned ahead, I know you will be too.

Ashton Mills
**Editor**

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MAXIMUM POWER COMPUTING

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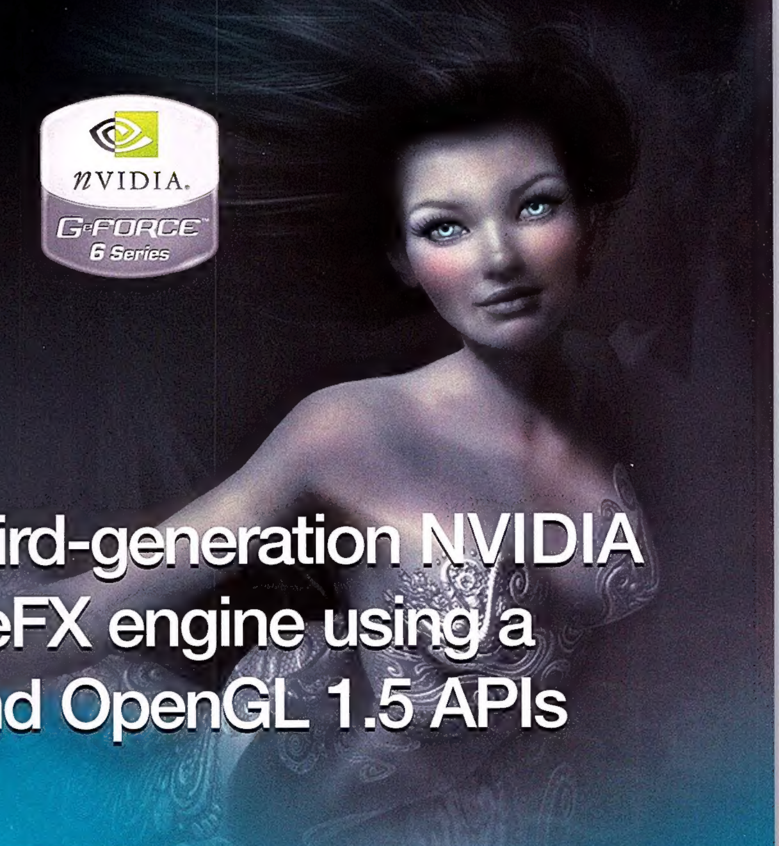

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# CDGuide

## The *Atomic* Security Kit

# Bulletproof PC

Time to spy with your little eye the latest in security tools! This month's CD is packed with firewalls, adware scanners, spam filters and anti-virus scanners – all you need to stop your box from being hacked and hijacked.

**REGULARS**

**CD BREAKDOWN**

### Compression tools

Archives are everywhere. This month's CD is no exception. Many of the programs we've stuck on the disc are compressed, and kept in ZIP, RAR, ACE and 7Z files. The only way you can get at them is by using one of the archiving tools we've provided. They're also good for shrinking stuff you might have on your computer, to make space for more important programs and files.

### Odd's end

Everything that doesn't fall into one of the other categories finds its way here. It's also where we put all those reader requested programs we receive each month. Try out Mozilla Firefox 0.9, Adobe Acrobat and the latest addition, FileZilla, the ultimate, free FTP client. If you think there's a program that should be here, email cd@atomicmpc.com.au with your request.

### Magazine

Get your additional magazine content right here. The Magazine section has everything you need to complete your *Atomic* experience. At the moment, it harbours the lovely Benchmarks page, where you can find out exactly what hardware and software we use to test, try out and just plain flog the crap out of the gear we get in. Be sure to stay tuned for more.

### Boot sector

It's the section that has only the best and latest drivers from all the big software and hardware manufacturers. Updates for your NVIDIA and ATI video cards; VIA and Intel chipsets and Windows operating system. If you want to keep your system running smooth, then this should be your first stop this month.

**THE NEW STUFF**

### Anti-virus and firewalls

They are your first lines of defence. Without some sort of virus scanner, worms, trojans and other nasties will have little trouble infecting your system. Chances are you won't even know you've caught something! The last thing anyone wants is to have their computer used as a spam mail proxy or denial of service zombie, so install one of the free scanners we've included on the CD and don't become a victim. Of course, no box is secure without a firewall, so go ahead and install one of the many we've stuck on this month's disc!

### Spyware and spam tools

There are some nefarious companies out there that are very adamant about finding out your browsing habits. Not content with surveys or polls, these businesses resort to installing software onto your system without your knowledge; programs that gather information about the sites you visit and the things you do online. This software, more often than not, will throw ads in your face, send you useless spam mail, and redirect your browser to places you simply don't want to go. Clean this crap off your box with this month's assortment of spyware sweepers and spam filters.

### Network and other tools

The professional needs more than just a virus scanner and a firewall. These defences need to be tested, to make sure they're doing their job. To give you a helping hand in making sure your computer is airtight, we've put a few tools on this month's CD that can probe ports, check what programs are running – even those that don't want to be seen – and connect securely to remote PCs.

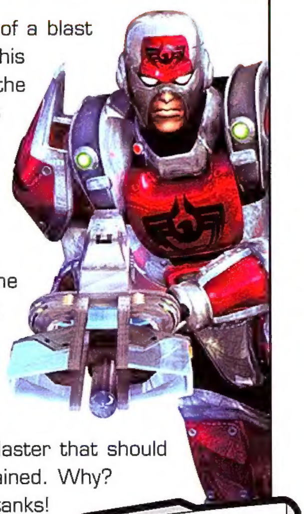
### Benchmarks

No one can call themselves hardcore unless they have, well, hardcore benchmarking tools. You may have every single one of Futuremark's performance testers, but they're only nibbling at a small slice of a very big pie. To make sure your arsenal of benchmarks remains formidable, you'll find some heavy duty and very pretty testing programs on this month's CD.

### Torque engine

Have a look at GarageGames' awesome 3D game engine demo. Best of all, you can make games out of it for a mere US$100, which includes access to all the source code and other content. Ever wanted to make your own title? Then this is the way to go! If this ignites your interests, read this month's Engine Room.

### Games



We all like a bit of a blast now and then. This month we have the smallest 3D FPS ever, called kkreiger, on the CD. It makes use of advanced DirectX 9.0 features, all in the space of a tenth of a megabyte. Quite amazing. We also have a demo of an isometric tank blaster that should keep you entertained. Why? Because it has tanks!

**WHY YOU WANT ME**

- Latest anti-virus and firewall tools
- Clean off spyware and filter out spam
- Updates galore for your PC
- Games, benchmarks and more!

## ShortCircuits

By the time you read this, the season one and season two boxsets of *Star Trek: Voyager* will be available. Which is rather cool, considering we've reviewed the season two boxset in Gearbox this month. To put it simply, it's quite ripper, and if you're a Janeway, Paris, or Seven-of-Nine fan (let's face it, who isn't?) then think about adding these complete season sets to your collection of DVDs. See the review on *page 18* for contact details.

According to various news sites, the soon-to-be-released Windows XP Service Pack 2 will contain DirectX 9.0c, the next version of Microsoft's multimedia and games technology for its Windows operating system. Like the last few releases, 9.0c's main focus is graphics, with this latest iteration introducing version 3.0 of the Shader model.

Anybody remember *Babylon 5*? Well, don't get your hopes up just yet, Captain John Sheridan is making a comeback. J Michael Straczynski, the creator of the now-defunct space opera, apparently has a pitch for a new *Star Trek* series. Last year, Paramount offered Straczynski an executive producer position on its current flagship *Enterprise*, which he declined, and Straczynski insists that his idea has nothing to do with the current series.

A yet to be passed US Senate bill, called the Induce Act, could see peer-to-peer file sharing services such as Kazaa made illegal. Penalties for violating the bill include prison terms and fines. Already under scrutiny, critics have said that the bill is too open-ended, and may cause problems for technologies that could *possibly* be used for copyright infringement, even if it's not their intended purpose. For more information on the act, visit: www.corante.com/copyfight/archives/004408.html#more

# Flash competition winners

Giddy up – the *Atomic* Flash competition has its winners!

Back in *issue 40* of *Atomic*, we ran a Flash animation comp in conjunction with the awesome people over at Macromedia (www.macromedia.com). They were nice enough to provide us with sparkling copies of Studio MX and Flash MX.

Awesome.

Two competitions were run – a creative comp, which was a no-bars free-for-all that focused on raw coolness to decide the winner. The prize: a copy of Flash MX. The second competition, and undoubtedly the 'biggy', was for a nifty Flash animation for the new *Atomic* CD interface. The creator of the chosen animation would receive a copy of Studio MX.

We had some incredible entries for both prizes... but, only two could receive a prize. Kudos to everyone who entered – the entire crew at *Atomic* HQ was impressed by what we saw.

Firstly, congratulations to Phillip Penfold for his 'Quick Intro to *Atomic*'. Phillip is the winner of the creative comp, and he'll be receiving a copy of Flash MX. Featuring a nifty rendition of the Windows XP interface, and numerous photos of *Atomic* meets and greets, Phil really blew our socks off with one heck of an animation. Nice work!

So then, who was the winner of the interface competition – the person who will take home a copy of Studio MX?

Well, without a doubt, that winner is Jake Stollery, who sent us a simply amazing animation that defined, in a sexy, succinct manner 'the *Atomic* effect'. You can check it out on this month's CD – just pop the disc in your drive!

Again, massive applause to all who entered – it was a mission to pick winners, and it goes to show that creativity has no bounds in the *Atomic* community. Also, big claps to the good people at Macromedia, who made our prize giving possible!

## Xbox 2 specs live

The technical details on the successor to Microsoft's Xbox, the Xbox 2, have found their way on to the internet.

According to the leaked 'whitepaper', the new console will sport a three-cored PowerPC processor, with each core running at 3.5GHz or possibly more. This CPU will be lead through graphics operations by a 500MHz ATI chip of unknown heritage – it will probably be based on the X800. One of the more interesting facts about the graphics chip is the onboard 10MB EDRAM that should significantly boost its performance.

Operating system-wise, the Xbox 2, or 'Xenon' as it's called in the whitepaper, will feature a cut down version of Windows NT, and a specially tailored version of DirectX 9.0. The console will have access to 256MB of RAM and a 12x DVD drive, although it remains 'undecided' whether hard drives will be sold with the system.

There is little doubt that the Xbox 2, going by these specs, will have awesome amounts of processing power to run the next generation of high-tech, hyper-realistic games. We recommend however you take them with a grain of salt until they can be confirmed.

## World Cyber Games 2004

What do you get when you mix games, computers, and prizes galore? Easy! World Cyber Games 2004! This year's WCG is already in full-swing, and if you think you have what it takes to compete against the best, now is the time to exercise your gaming grandness and blow the pants off the global opposition.

All the big titles will be up and running, including Counter-Strike, Starcraft, Warcraft III, FIFA 2004, NFS: Underground, Unreal Tournament 2004, Halo and Project Gotham Racing. So no matter where your skills are based, there will be a game available to throw yourself into.

If you happen to come out on top, you'll be on your way to San Francisco to compete in the finals and play for the serious prizes. There's no time to fluff around however, you'll need to get yourself sorted and registered before everything is finalised – a week or two from now. For all the details regarding local events, visit: www.worldcybergames.com.au.

For more information regarding the event itself – locations, sponsors, prizes, etc, check out the official website: www.worldcybergames.com.

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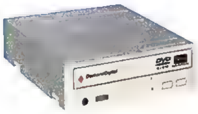

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# Getting paid to play

Daniel Rutter looks into his crystal ball and envisions more to MMOGs than just hack'n'slash gameplay.

The mainstream media is just starting to notice that there are people making a real living by working in virtual worlds. Ultima Online PC-farms macroing away all day, hordes of minimum-wage Koreans doing EverQuest's most tedious jobs, and the proceeds being sold through auction sites or dedicated brokerages for cold hard cash.

The game companies insist that virtual goods have no value, but they do that mainly to avoid liability. If Sony accepts the EQ-plat-to-US-dollar exchange rate, every server crash that cheats players out of everything they did for the last four days will spawn a class action lawsuit.

Obviously, things with no material existence can have value. That's what the whole copyright brouhaha's about, and plenty of things less material than a +7 Pointy Stick of Biped Slaying are traded for vast sums of money on derivatives markets every day.

Accept that virtual things are still things, and making hats or hunting games or Tomb Raiding for magic items in games becomes, qualitatively, surprisingly similar to various jobs in the real world.

What actual humans actually have to do in order to perform in-game jobs is, of course, almost always completely different from what they'd have to do to perform an analogous task in the real world. What everybody in games *really* has to do, to some extent at least, is pretend. Games turn everyone into an actor. Soccer makes you pretend a ball in a goal is a very important thing, many FPSs are full of people pretending that they're unduly obsessed with red and blue flags, and RPGs have 'role-playing' right there in their name.

I'm looking forward to games that reward proper acting more than the current crop. Not acting in the 'Huzzah! Well met, good sire!' Renaissance Faire sense, but in the broad role-playing sense. The game should encourage you to behave like the creature you're meant to be, without punishing you if you absent-mindedly mention the weather in the real world to your adventuring companions.

> **Accept that virtual things are still things ... and Tomb Raiding for magic items in games becomes qualitatively, surprisingly similar to various jobs in the real world.**

Consider, for instance, a massively multiplayer game that doesn't necessarily cost anything to play.

If you want to be Schlong The Barbarian, Invincible Vanquisher Of Anyone Who Bathes, or Grimstaff Cliché: Thermonuclear War-Mage Of The West, you have to pay big bickies for the privilege. Characters like that will cost a lot of in-game meta-dollars to create. This is already starting to happen, thanks to third-party game-item-merchants.

But if you just want to be a regular schmoe, starting from level one, you can get in for cheap. And if you're even less prideful, you can get paid to play.

Game companies don't need to pay people to create in-game items; those they can make themselves from nothing in whatever quantity they like. What they can pay people to do is act, especially in thankless roles.

Start as a kobold, goblin or other level-1-player-fodder kind of monster, and you should *earn* meta-dollars (which you can later use to play something more flexible) whenever you do something to advance your inglorious species' cause. Like actually managing to jab the fairly sharp stick that is your only armament into a human, for instance.

The value of low-toughness characters could float, based on supply and demand. If there are already 3475 little dog-faced blighters running around and you decide to spawn as a kobold too, you should only earn one credit an hour no matter what you do (but you'll still get to be part of the Mass Storming Of The Clean And Muscular Humans' Castle). If there are only 20 human-controlled kobolds on the thousand-player server at the moment, though, then playing as one should be worth a credit a minute, as long as you spend those minutes doing koboldly things.

I don't think there's any way to make playing as a Lurker Above or Shrieker entertaining; they're going to have to stay as NPCs. There similarly probably won't be a big market for the roles of Mimic, Monster Waiting Behind The Door, or Magically Animated Floor In Exodus' Castle.

But a simple yet entertaining game *can* be crafted that involves playing as a low-power beastie. Especially if after your inevitable death you can respawn into the body of another beastie, which was previously an NPC, close to the action, and retain the benefit of whatever experience points you by some miracle managed to acquire in your previous life.

If you can get game credits for doing this stuff, people will. Look at the dead boring press-lever-for-food-pellet things that people *already* pay a monthly fee to do in MMO games.

This idea has no doubt already occurred to people who, unlike me, actually know something about game design. It's probably been rejected for boringly prosaic reasons, like the fact that you'd end up with a server groaning under the weight of a hundred thousand non-paying ghosties, ghoulies and long-leggety beasties, and not be able to cover your bandwidth bills.

But if the concept can be finessed into reality, it could dovetail very nicely with the brave new world of 3D VR fully immersive gaming that we'll all be enjoying several years from now. As games widen and deepen conceptually as well as merely cosmetically, the game companies are going to need more cooperation from their player base in making the game world rich and interesting.

Loads of Fighters called Supa Killa and talking 1337-5P34K will not help with this.

People avariciously pursuing the Path of Perfect Orchood, though, will.

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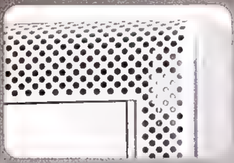
## On a budget? Well, don't look here!

# New Lian Li V Series Aluminium PC Case



Perforated [illegible]
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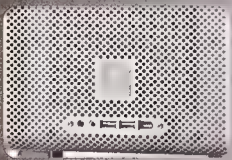
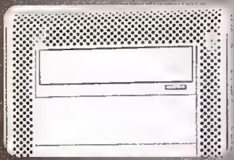
5.25" bay conve[illegible]
bay with alumini[illegible]
bezel (5 x 1.25" [illegible])

[illegible] bearing fan with
[illegible] sound
[illegible] and
[illegible] rubber ring in
[illegible]

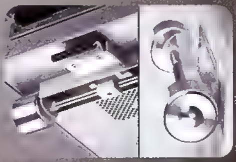


Multi-media I/O
(IEEE 1394/USB/[illegible])

Separate power supply zone
with holes for cables

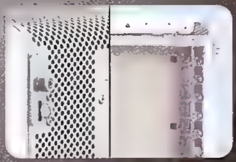


Aluminium CD-ROM bezel



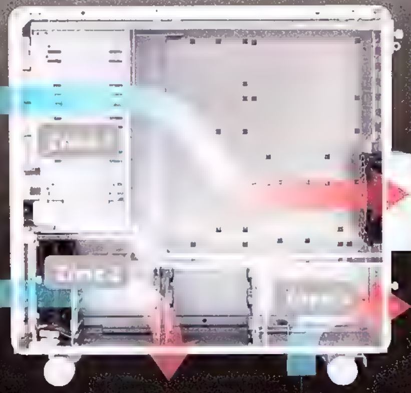
Aluminium casters with brakes

Sliding tracks for easy assembly
of HDD (6 x 3.5" bays)



Captive screws allow for
easy removal of side panels

12cm ball bearing fan with filter
and anti-vibration rubber ring in
front panel



Zone 1

Rear 12 cm fan is located next to
the CPU Cooler

Zone 2

Front 12cm fan is located next to
the HDD

Zone 3

Power supply fan circulates cool
air from the bottom of the case
out through the rear panel

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# Call to tools

Ben Mansill hopes the revolution isn't over while there's still fight left in the troops.

The challenges we face, and how we surmount them, is what defines us. For decades, beige steel computing remained entrenched and unchallenged the way it was. In a few short years we turned that on its head. We could simply point to our modded PCs and explain, simply, that *this* was what made us different.

Our small movement has rippled across a great industry – some would say an *age*, and redefined it. We alone, it seemed, appreciated computing for the hell-cool awesomely sexy thing it was, and we shaped our machines to represent that feeling. Faced with a seemingly unending eternity of beige frustration, we took matters into our own hands.

Paint, perspex, neon. These became the materials of our sub-culture. The destruction of a beige box was, in itself, great reward, but morphing it into something unique was the goal. It was also a transition of the geek from purely electronic, to physical. We wielded tools, embarking on heavy duty garage projects which no doubt allayed the fears of many a red-blooded father that their sons and daughters were slipping into a world of dark reclusion. 'Look sweetie – he's using my tools to cut steel! Cut steel!'

As quickly as the wonder of outside observers turned to scorn, as our modded boxes dangerously gravitated to resemble every other one, we shifted it up a gear. Always performance oriented, our mods began to integrate engineering with sculpture. As the boundaries of overclocking were pushed, extreme cooling became the next phase in the evolution. Now our machines were truly wicked. They were modded from the skin to the heart. The whine of a dozen fans sang of *power*. Our pride was enormous. We were mad scientists! Inventors! We had taken the most remarkable and advanced technology on the planet and re-engineered it, with our hands alone, creating a barely tamed mechanical monster.

Looking back at the excitement of those days, it's clear that our drive for individuality was never in any doubt. A new culture was emerging, one born of righteous intent. It was fuelled and vindicated by a blooming of overclocking and performance-oriented internet sites. The LAN party scene helped things along powerfully by ensuring competition played a part in accelerating modding innovation. Magazines like *Atomic* came along and were able to represent the scene on lovely glossy paper. The tide had forever turned.

Some form of mod became obligatory. From mounting an extra case fan, all the way up to neon, or whatever other magic could be found in auto parts shops.

> We had taken the most remarkable and advanced technology on the planet and re-engineered it, with our hands alone, creating a barely tamed machanical monster.

Custom HSFs were a particularly tasty mod. Truly beautiful aluminium sculptures of negligible performance value. The era of the orbs! We pretended our Golden Orbs were Alpha Coolers and felt good.

About then, the power of free enterprise swept in and everything changed forever.

From the land of Taiwan came bits for modders. Innocuous and convenient at first. A fan rheobus, appliques, fan grills. Sound-sensitive cold cathode. Ohh, that was nice. How we remember our first fan with embedded LEDs! How we oogled. Braided cable! Then, luminescent braided cables! How wonderful! We stood under a waterfall of funky glowey bits! Every month there were new cool things to desire. The once uncomfortably barren 5.25in panel could be home to any number of tempting control centres. I remember fondly how mates of mine, previously disinclined to 'mod', could now install $50 worth of bits and feel like troopers for the cause.

Of course, these trinkets were nice, but a mod wasn't a *real* mod unless the case itself had been munted around a bit. We ran tutorials for cutting and painting and tooling around. We truly lived in a golden age.

Then the Lian Li PC-60 arrived. A case made of aluminium? Behold this wonder! It was so light! LANning was freed of sore shoulders. It was seriously good looking, a perfectly elegant shape, beautiful left as is, or an equally wonderful blank canvas for toolwork. Some sort of good revolution was clearly taking place.

Without stretching the hyperbole, I remember clearly when first I saw and touched the PC-60. I also remember the mild anger I felt when the clones first started arriving. We scoffed that any upstart company would dare mimic this gem of engineering perfection.

Of course, it didn't take long before we were all forced to graciously concede to a new age. Pre-installed perspex windows, fully engineered water-cooling, the impossibility of buying any accessory that didn't glow in some fashion.

Which leaves us at a crossroads. We have never had more scope to create hot boxes of stunning beauty and remarkable performance. The thing is – we're merely assembling them from off-the-shelf bits. Our little sub-culture has grown into an industry. Our subversive innovation created a niche for companies to provide cheap and easy solutions.

But we don't want easy!

Well, some of us don't. There's no excuse now for any of us to not sport a box of power and beauty. But more than ever we need people prepared to show us the new way into the future. To inspire us. In a world now abundant with everything we've ever wanted, we must have the clever few at the forefront showing us the path forward.

We are power hungry. We are never satisfied with what everyone else can have. We are crazy creative. We are at the end of one phase, at the beginning of another. We've created life in a dull void, now it's time to figure out what the next push is. I don't know what it will be, but I think you do.

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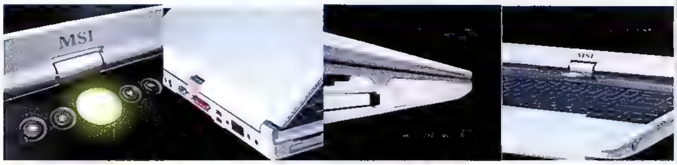
**RATINGS**

OVERALL

116

| PERFORMANCE | FEATURES | VALUE |
|---|---|---|
| 129 | 114 | 111 |

100 IS THE AVERAGE



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# Crossed streams

Do we need technology in our lives? Tim Dean thinks *Atomic* is the most inappropriate forum for that question, but asks it anyway.

OK, I'm going to kick things off by saying there are two types of metaphysics. One is about crystals, ESP, astral vibrations and other new age mysticism that involves rotating your chakras around Uranus, or something. The other is the philosophical inquiry into the fundamental nature of reality. Kind of related subjects, but the two metaphysics are very, very different in practice.

In fact, whenever two opposing metaphysicians meet in the street – one usually wearing a brown tweed jacket and thick-rimmed glasses, the other a kaftan and a feather sticking out of their hair – they are obliged to challenge each other to a breakdance duel.

The reason I mention this distinction is I remember one poignant moment at uni when a student approached one flavour of metaphysics from the perspective of the other. As you can imagine, it was an interesting conflagration – as Dr Egon Spengler says, 'Don't cross the streams'.

This particular student chose to challenge a metaphysics lecturer about the posed question of whether or not chairs exist beyond our perception. The student questioned the usefulness of such an inquiry, and asked whether knowing the answer to this particular ontological conundrum would help us all live better lives.

Tough question, but the lecturer rose to the challenge. Offhand, he replied 'this is not a lecture on interpersonal relationships – if you want that, go to the psychology department, or better yet, go hang out at the bar'. Tough. But fair...

Interestingly, I recently had another experience of this kind of crossed stream – in this case, at a dinner with a number of Australian and Japanese executives from Sony.

One particularly perky Kiwi journo raised the somewhat controversial question of whether humanity really needs all this new technology. So, despite presenting the kind Sony execs (who, I might add, paid for the very adequate repast) with a veritable slap in the face as to their chosen profession – he raised a prickly, but fascinating issue in totally and utterly the wrong forum.

Thankfully, one of the Sony executives headed off the debate at the post, and diplomatically proclaimed that they are in the business of making people happy. Apparently if you ask how people feel about their Sony Walkman, they say it makes them happy. Case closed.

However, this is an interesting question that I think is worth considering. So, *do* we need all this new technology? Does technology make our lives better? Or does it distract us from true happiness by pandering to our desires for short-term pleasures at the expense of long-term satisfaction?

First off, we need to be clear about what technology really is. From the outset it's important to state that technology is *not* science – nor is it even 'applied science'. Technology and science are related, but they are not the same thing. For one thing, technology has been around a lot longer than the scientific method, and while much new technology comes from scientific research, there is plenty of technology that doesn't.

For the record, technology, at its barest, is the study and use of tools, processes or knowledge to do things or to improve the way things are done. Incidentally, the most primitive form of technology is generally considered to be the sticks that some jungle primates use to lift termites out of their mounds and into their mouths. As you can see, technology doesn't need to be mechanical, industrial or electronic.

Notice, though, that in the definition there's not even a specification that technology need be directed towards making things 'better' nor does it have to be about making people 'happy'.

This presents some interesting questions. If technology is amoral, and it's just a tool (or a tool for making tools...), then the question of whether we need everything technology can spew forth is a surprisingly relevant one. After all, we are the ones injecting technology with its intention and purpose if it can't do that itself.

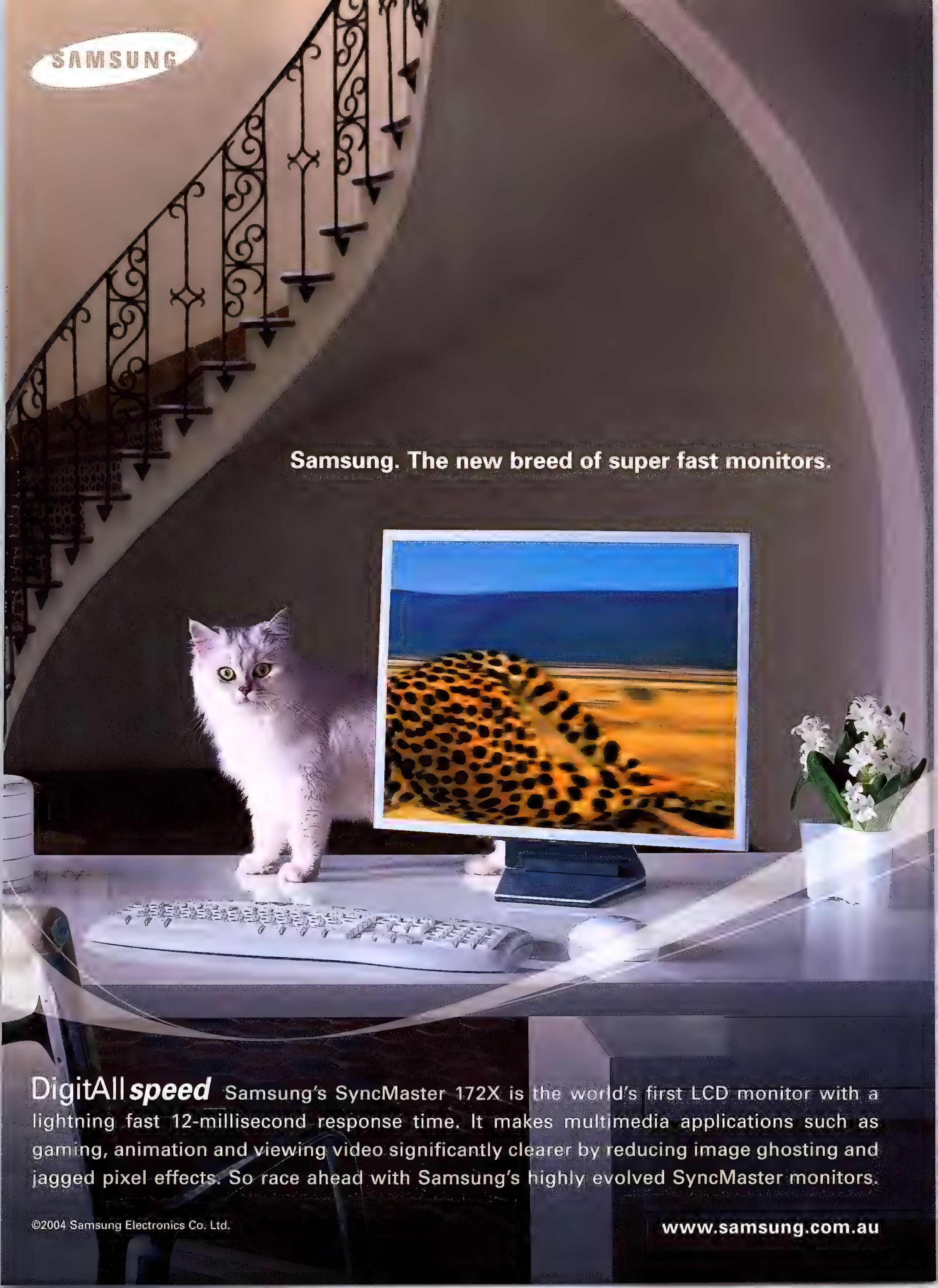
Thankfully, the question is already partially answered due to its being tied to capitalism and consumer culture. These days most technology is developed for people to consume – and they're only going to do that if they believe it's to their benefit.

> There's not even a specification that technology need be directed towards making things 'better' nor does it have to be about making people 'happy'.

So, by questioning the value of technology, most people are actually questioning the principles of capitalism and consumer culture – and that's a whole other story... Briefly though, I think that if most people questioned whether we need technology to make us happy, the broad answer would be 'no'. But, we have come to rely on many technologies to make our lives better, and despite the crap flying around the world today, on the whole we are better off (at least in the 'first world') than we ever have been before.

However, this also depends on how you define 'better off' – and I certainly know some Buddhists that would argue that simple spiritual satisfaction through the reduction of desire is stronger than building new tools to attempt to satisfy desire that's spiralling out of control.

I reckon what we should do is accept that technology is an intrinsically amoral thing, and we need to make sure we direct it properly. We need to have a purpose and intention for technology. We shouldn't just blindly accept any old technology thrust in our face, in the same way we shouldn't blindly accept any old belief system about the healing properties of super-energetic vibrations emanating from a picture of an old dude with an enormous 'fro. Given that, let's not question the benefits to humanity of a graphics card the size of a Buick coupled to a PC capable of killing a pigeon from twenty paces from radiation alone – the intrinsic beauty of such a device is purely self evident...



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## 1 Thermaltake XRay

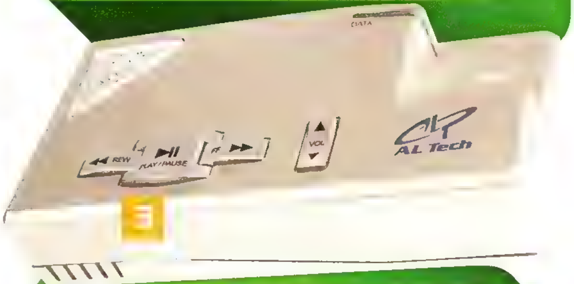
**Supplier:** Thermaltake
*www.thermaltake.com.au*
**Phone:** (03) 9763 1622
**Price:** $29

First there was the cup holder (aka the CD-ROM drive). Next there was the cigarette lighter, and now the bizarre 'Xray' from Thermaltake incorporates the best of both. Legally drink, smoke *and* drive (or frag) in true comfort. Feel the heated envy. A removable base means it can double as an ashtray, but watch where the ash is going!

## 2 *Star Trek Voyager* Season 2 boxset

**Supplier:** Paramount
*www.startrek.com*
**Phone:** (02) 8303 0800
**Price:** $150

Of all of the Star Trek series, Voyager is by far the most cockle-warming – if not simply for Jeri Ryan's bodacious borg, Seven-of-Nine, or the quirky wit of the ship's holographic doctor, played by Robert Picardo. This season 2 compilation, with all 22 episodes, should be out by the time you read this.



## 3 Altech Anydrive Car MP3

**Supplier:** Anyware
*www.anyware.com.au*
**Phone:** (07) 3856 3999
**Price:** $99

With a growing trend of PC bits in cars, this ingenious piece of tech enables you to play MP3s directly off a USB flash drive via headphone or FM transmission. Simply jack it into the 12v DC lighter, whack in a USB flash drive full of MP3s and tune the car's radio to the chosen channel. Not cheap, but creatively inspired!

## 4 Philips Micro Audio Jukebox

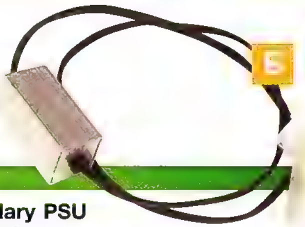
**Supplier:** Philips
*www.philips.com.au*
**Phone:** 1300 651 993
**Price:** $449

Philips' Micro Audio Jukebox sits somewhere between a Flash based player and an iPod level hard drive. It uses a 1.5GB hard drive to store music – enough space for between 350-700 songs depending on format, which should keep you boogieing down for quite some time.

## 5 NU Drive 256MB

**Supplier:** PC Case Gear
*www.pccasegear.com.au*
**Phone:** (03) 9584 7266
**Price:** $143

In an appealing Chinese-English translation, this comfy though otherwise ordinary USB 2.0 flash drive claims to be both shock and water proof. It even claims to be damp proof (haw!) Well, it somehow managed to survive the knocks and obscene amounts of water dunkings, so at around 56 cents per MB, this is a bargain.



## 6 Secondary PSU Cable adaptor

**Supplier:** Anyware
*www.anyware.com.au*
**Phone:** (07) 3856 3999
**Price:** $19

Running two power supplies is an easy thing to do. Short the green line with a ground on the second PSU, and you'll have more juice to share around, and it will turn on as soon as the PSU's power switch is flicked. This nifty little widget attaches two PSUs together so when the primary PSU is powered up, so is the other.

What's this, just one page of gadget goodness? Fret not, the wondrous gadgetry of Gearbox will return in full next month!

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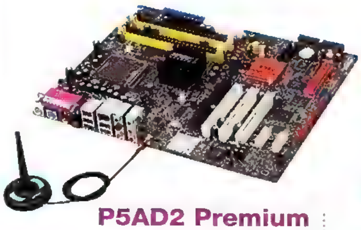

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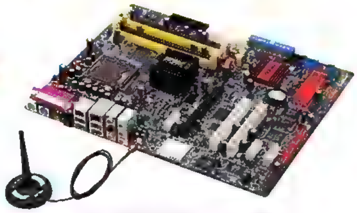
Intel PAT
Triple RAID
Dual Gbit LAN
WiFi-g onboard
1394a/b
PCI EXPRESS™



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Dual Gbit LAN
WiFi-g onboard
1394a/b
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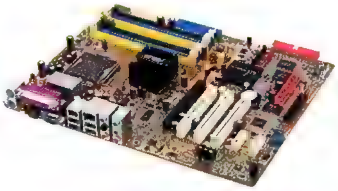

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Intel Graphics Media Accelerator 900
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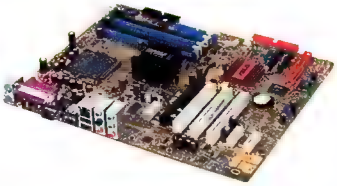
Triple RAID
1x Gbit LAN
1394a
PCI EXPRESS™



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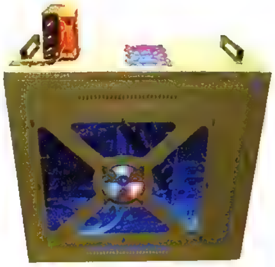
# Hotbox of the year 2004

Gather around as we celebrate the beauty of the box. Master Craftspeople from all corners of *Atomic* have presented to you, over the last wonderful year, their creations of tech art. In each issue, you have picked your favourite of the month, voting online. NVIDIA has generously supplied prizes over the year, as they do now for the grand finale! Reward what is the essence of *Atomic*. Vote now and show your support for clever and creative Atomicans!

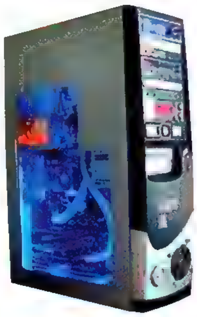
**www.atomicmpc.com.au/hotboty.asp**

We know there's even more creativity out there, so share your Hobox with *Atomic*. Email us your pics and a 200-word description, just like you see in the pages of the mag, for your 15 minutes of Hotbox fame! Email to: hotbox@atomicmpc.com.au

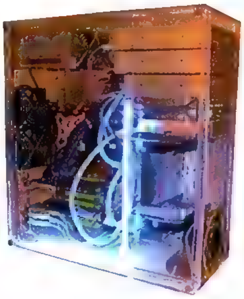
**01** Brett's MEMA 600



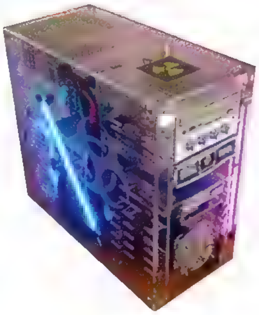
**02** Srdjan's Geronimo Box



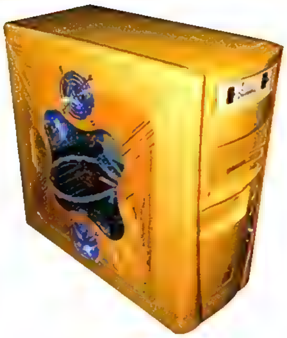
**03** Murray's MuzPC



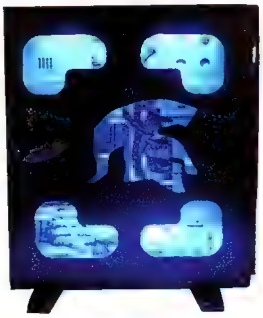
**04** Justin's Precious



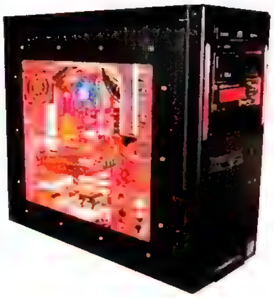
**05** SHORT's Timber and Ice



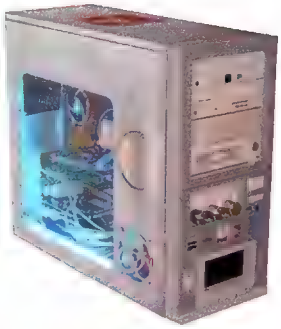
**06** Flaminspartan's iCe BlueBehemoth



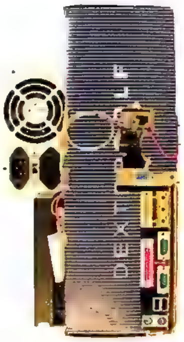
**07** Lord Shaper's Furnace



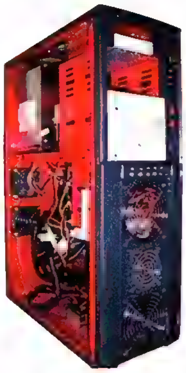
**08** MetalZone by David



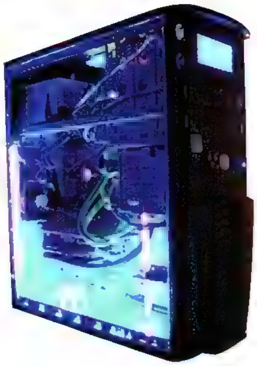
**09** Nosferatu's shoeBox



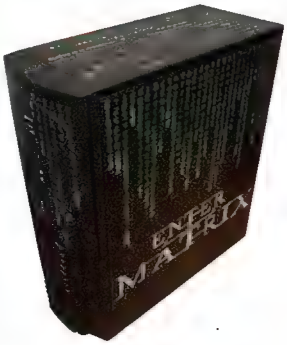
**10** Project DR@G[o]N Case



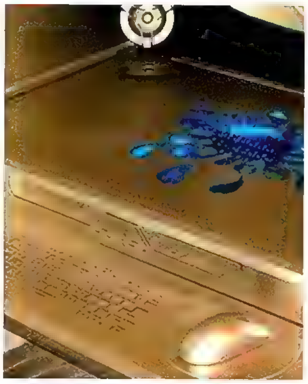
**11** Marcus' RogueHotb0x v2.0



**12** Marco Enters the Matrix



**13** Tony's Integration Alumicoat



**14** BlackMagic V2

**15** Troy's BLUBYU

**16** EchO's Computer in a Briefcase

**17** Soviet's Red Box

**18** Austin's Computed Desk

**19** THW01F's POWER and the GLORY

**20** Justin's Sterilizer

**21** Steve's Warcraft Box

**22** G33k Ninja's Midnight Marauder

After a year of fierce Hotboxing, a winner must be chosen.

Hotbox of the year wins the perfect blank canvas for next year's challenge. Not content with awarding a powerful nForce2 mobo monthly, our Hotbox sponsor, NVIDIA, is giving away a cutting edge, $3000, PC.

Built around NVIDIA's nForce3 250 GbE chipset for the Athlon 64, and the most advanced desktop GPU on the market – the GeForce 6800 Ultra – this is a system to die for. It has all the processing and graphics power the winner will need to get the most from the next generation of killer games.

It truly is a monster PC, no monitor, no keyboard, no mouse, just a box packed with high end hardware. That is what the Hotbox of the year will score the lucky builder. It is up to you, so get online and get voting now: www.atomicmpc.com.au/hotboty.asp

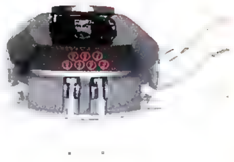
**$3000**

**worth of gear!**

www.atomicmpc.com/hotboty.asp

23 The Carlos Reactor

24 Alex's Spider Case



25 Azz's The Beast Within

26 Peter's Lizi

27 Mif's Vampire Ascension Box

28 XGhost's Xtreme PC

29 Brian's Christine

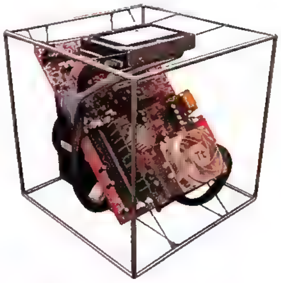
30 David's LANcase

31 thydzik's matchboxPC

32 Al's Big Ally

33 Troy's Breadbox

34 Cleary's eSSentials



36 Web Dreams' WRX Rally

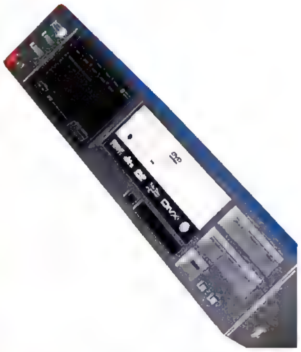
## Hotbox of the year 2003 - previous winner

**Box:** Aural Decipher
**Boxer:** Mark White

37 The Firebox

38 Kozen's Tron Box

39 Dave's HTPC



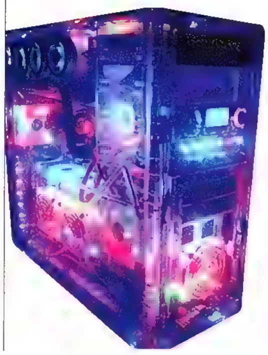
40 Euclid 2

41 Felipe's FX LAN BOX

42 Lambo's Baahbox

43 Albi's CO² Box

44 Banzai's Light House

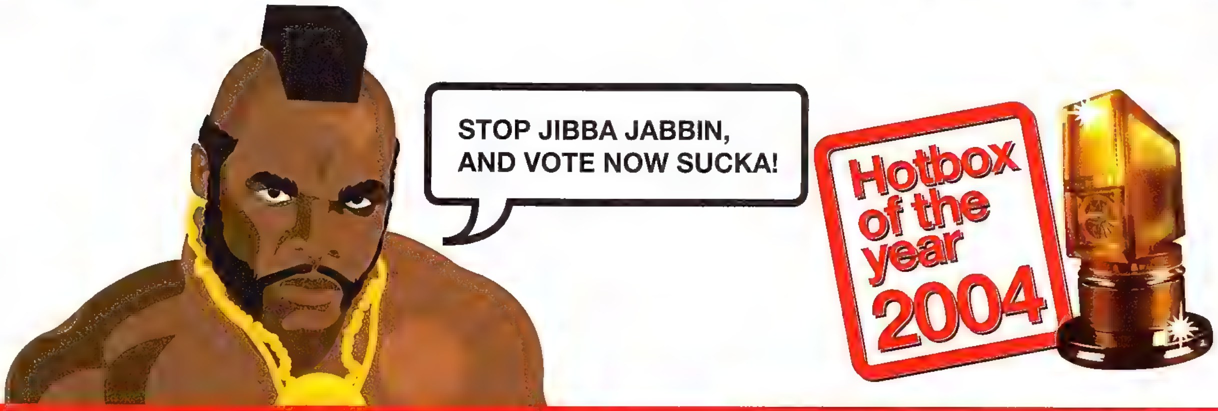


45 Pteropid's Painful Pewter

46 Wiley's Marantz Case

47 Holdenkicks' Blue Beast V4

48 Chris' Bomb



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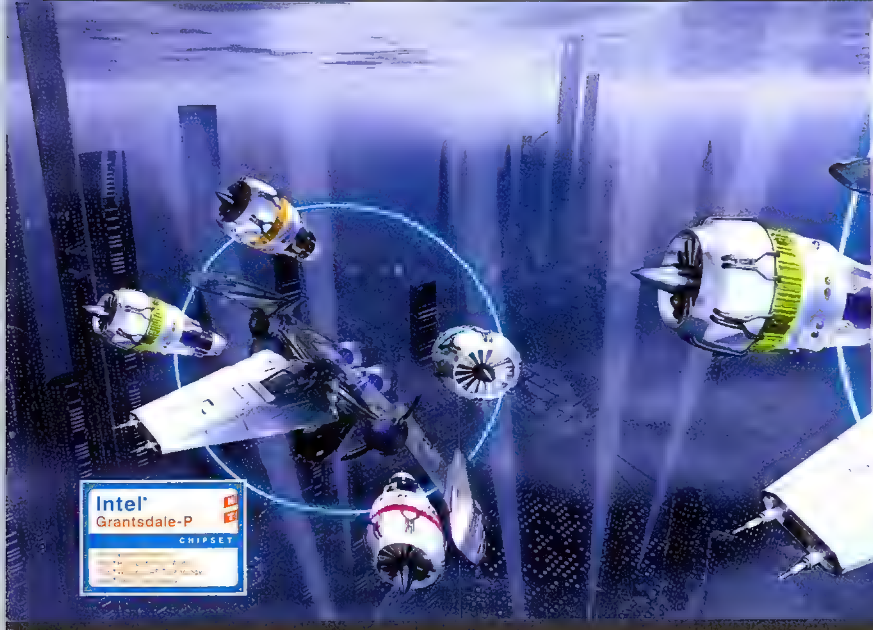

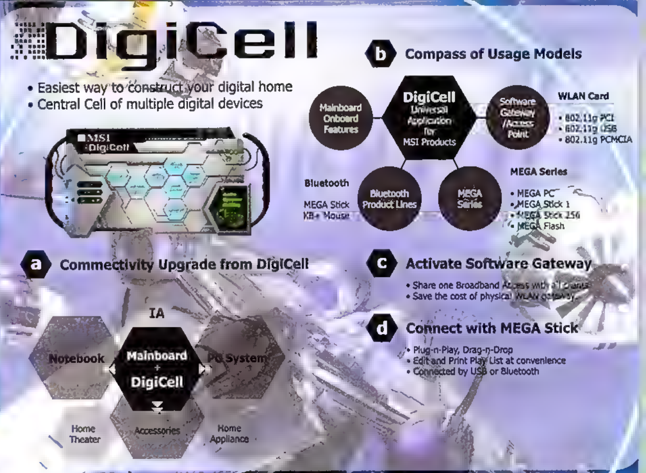

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**b** Compass of Usage Models

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MEGA Stick
KB+ Mouse
Bluetooth Product Lines
MEGA Series
MEGA Series

- 802.11g PCI
- 802.11g USB
- 802.11g PCMCIA

- MEGA PC
- MEGA Stick 1
- MEGA Stick 256
- MEGA Flash

**a** Commectivity Upgrade from DigiCell

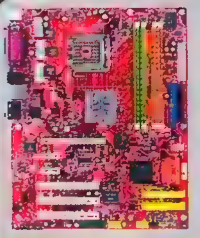
**c** Activate Software Gateway

- Share one Broadband Access with all clients
- Save the cost of physical WLAN gateway.

**d** Connect with MEGA Stick

- Plug-n-Play, Drag-n-Drop
- Edit and Print Play List at convenience
- Connected by USB or Bluetooth

# Grantsdale with CoreCell Technology



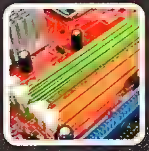
## 915P Apex (MS-7028)

Intel® Grantsdale-P + ICH6R chipset

- Socket 775 for Intel® Pentium® 4, Prescott and Tejas processor
- FSB: 800MHz
- 4 DIMMs for Dual Channel DDR2 533 memory up to 4GB
- 1x PCI Express X16
- 2x PCI Express X1, 3x PCI
- 8x USB 2.0 (480Mbps)
- Onboard PCI Express 10/100/1000 Gigabit Ethernet LAN (Optional)
- 3x IEEE 1394 up to 400Mbps (Optional)
- 4x Serial ATA + 1x Parallel ATA 100 by ICH6R. Support AHCI, RAID 0,1
- 2x Parallel ATA 133 connectors by VIA RAID, Support RAID 0,1, 0+1
- 7.1 Channel High Definition Audio, Universal Audio Jack (UAJ)

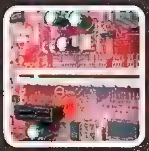
### LGA775 Processor

Supports the highest performance Intel® desktop processors on LGA775 processor package.
Supports platform longevity with today's highest Intel® processor frequencies and delivers greater system bandwidth.



### Dual-channel DDR2

memory architecture natively supports faster transmitting and lower power consumption. Use single module to achieve 6.4GB/s bandwidth.
There is no compromise between stability and overclocking on DDR1.



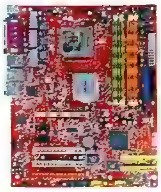
### PCI Express

Designed for bandwidth-intensive applications. PCI Express x16 Graphics delivers up to 4GB/s/direction, and up to 4X faster than previous high-end discrete graphics solutions. PCI Express x1 I/O offers 500MB/s concurrently, for 2X bandwidth over traditional PCI architecture.

### Communication Slot

Ultimate interface for PCI interface network card. MSI optimize and extend from ordinary PCI specification. MSI develop proprietary Dual-Net card exclusively for communication slot. Combine 802.11g wireless networking and Bluetooth communication technology into one add-on card and antenna. Provide convenient connection to most wireless devices.

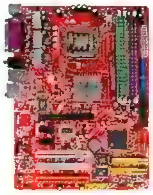
## MSI Grantsdale platform, with high-bandwidth interfaces and discrete graphics, supporting the Intel® Pentium®4 Processor with Hyper-Threading Technology.



### 925X Apex (MS-7053)

Intel Alderwood + ICH6R chipset

- Socket 775 for Intel® Pentium® 4, Prescott and Tejas processor
- FSB: 800MHz
- 4 DIMMs for Dual Channel DDR2 533 memory up to 4GB
- 1x PCI Express X16
- 2x PCI Express X1, 3x PCI
- 8x USB 2.0 (480Mbps)
- Onboard PCI Express 10/100/1000 Gigabit Ethernet LAN (Optional)
- 3x IEEE 1394 up to 400Mbps (Optional)
- 4x Serial ATA + 1x Parallel ATA 100 by ICH6R. Support AHCI, RAID 0,1
- 2x Parallel ATA 133 connectors by VIA RAID, Support RAID 0,1, 0+1
- 7.1 Channel High Definition Audio, Universal Audio Jack (UAJ)



### 915P Neo (MS-7052)

Intel Grantsdale-P + ICH6 chipset

- Socket 775 for Intel® Pentium® 4, Prescott and Tejas processor
- FSB: 800MHz
- 4 DIMMs for Dual Channel DDR2 533 memory up to 4GB
- 1x PCI Express X16
- 2x PCI Express X1, 3x PCI
- 8x USB 2.0 (480Mbps)
- Onboard PCI Express 10/100/1000 Gigabit Ethernet LAN (Optional)
- 3x IEEE 1394 up to 400Mbps (Optional)
- 4x Serial ATA + 1x Parallel ATA 100, Support AHCI, RAID 0,1
- 1x Parallel ATA 133 by VIA RAID, Support RAID 0,1 (Optional)
- 7.1 Channel High Definition Audio, Universal Audio Jack (UAJ)

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# Digital Rights Management, Fritz, and you

Sinister silicon is the name of the game when it comes to enforcing what some now call Digital *Restrictions* Management. Daniel Rutter reveals all.

Media companies – the corporations that sell movies and music – don't like computers.

No computer can operate without flawlessly copying digital information. A company that doesn't want certain information copied, therefore, has a problem with computers at the most basic level.

The solution to this problem, from the media companies' point of view, is Digital Rights Management – DRM.

DRM is meant to stop you illegally copying things. Along the way, it may stop you *legally* copying things as well. But probably not in Australia, where making MP3s from CDs you own, making a copy of a CD to play in your car, backing up your DVDs, or even recording a TV program with your VCR, is not in fact legal anyway (did you think it was? Sorry. Check out www.copyright.org.au).

If the media companies get their wish, a new wave of hardware-backed DRM will make unlicensed copying of copyrighted material not just illegal, but physically impossible.

## DRM then, now and tomorrow

You may have never used an online music store or bought a read-restricted electronic book, but you probably have encountered DRM. You may have encountered it 20 years ago, in fact, because game copy protection is DRM.

Game copy protection is also, famously, ineffective. They've been working on it since the Apple II was a hot new system, but these days the cracks sometimes come out before the game.

The reason why copy protection works so poorly – inconveniencing legitimate users while hardly slowing pirates down – is the motivation behind hardware-backed DRM. Software-only DRM schemes don't work because programs executed by the user have as much control over the computer as the user does. As most Windows users operate from an administrator account all the time, anything they run can do anything it likes.

A remote server can, therefore, ask a current game whether it's had a No-CD crack installed. And the cracked game can say 'No, sir!' in response. And the remote server will be none the wiser, because there's no way for it to see what it's talking to.

Hardware-backed DRM can stop this from happening, by providing an (allegedly) completely reliable component in the computer whose declarations about hardware, firmware and software can build a 'Chain of Trust' from the moment you turn the system on. This chip can guarantee that software really hasn't been modified.

The chip in question is commonly known as the 'Fritz chip', after US Senator Ernest 'Fritz' Hollings. Senator Hollings received an awful lot of donations from media companies and, coincidentally, sponsored an awful lot of legislation that the media companies liked.

Fritz is a secure cryptoprocessor – a tamper-resistant cryptographic sub-processor, designed to create a 'secure environment' in a PC, as part of 'Trusted Computing' (TC). Or 'Trustworthy Computing', to use the ever-reassuring Microsoft term. Or 'Treacherous Computing', if you believe the Free Software Foundation.

Trusted Computing isn't all about DRM, but TC is essential if the media companies are to make personal computer DRM that really works. When a TC system starts up, Fritz will check the BIOS contents against a hash of its previous contents. If the BIOS has changed, nothing the computer subsequently does will be, ah, trusted.

The same goes for the bootloader and the operating system itself; Fritz will make sure everything matches its hashes of what an unmodified system looks like, to make sure that nobody's changed anything. TC-compliant applications will, themselves, be encrypted, and Fritz won't spit out the keys needed to decrypt and run them if it's not happy with anything in the startup chain.

If Fritz is unsatisfied, you'll have to hit the net to get yourself re-certified. If the hash for your new BIOS version, or video card, or OS patch, or whatever is known to your OS provider, you'll be OK. If it isn't, you'll be sad.

Assuming the startup passes muster, the PC will then be ready to do regular computer-ish things. Now we hit the four pillars of Trusted Computing.

The different companies and consortia developing Trusted architectures call these basic functions different things.

## Strong process isolation

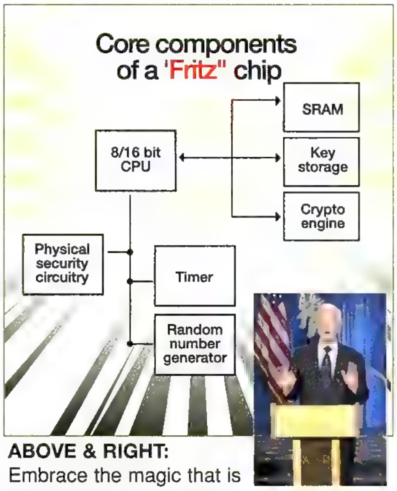
Process isolation is also known as 'memory curtaining'. It's the creation of areas of memory that no unauthorised process can access. If Fritz has verified that the startup process is unchanged, and also verified that an application's hash matches the hash it ought to have, then that app will not just be allowed to run, but can also set up its own chunk of inviolable RAM. No other process can see into that RAM without permission.

It's quite easy to write an operating system that works this way. Fritz just makes sure that the OS actually *is* the one that works this way, and not a modified version that's only *pretending* to do memory curtaining.

## Sealed storage

This is encrypted storage, which can only be read by the same combination of hardware and software that wrote it. Again, this can be done right now, but Fritz can guarantee the racial purity of the software involved.

So, for instance, you could have some downloaded music from the MonsterCorp On-Line Music Store on your computer. Those files will only be playable by the MonsterPlayer application, again on your computer, because only it will decrypt them.



**ABOVE & RIGHT:** Embrace the magic that is the 'Fritz' chip. It wants to encode you.

You can burn the files to a disc and give them to a friend if you like, but your friend won't be able to read them (well, unless the encryption itself turns out to be crackable). Your friend also won't be able to play the files by pretending to be you, because every Fritz will have a different internal key, building a fundamental identity for each computer to which everything else's encryption will be tied, even if the system's otherwise identical.

There are obvious authentication issues, here. Upgrade or replace your computer and, along with the other TC-related issues, your old sealed storage files will be illegible. You'll have to re-authenticate yourself with the file provider, then rewrite the files so that now they're only legible on your *new* system.

What if MonsterCorp's gone out of business? Well, you bought a licence to listen to your music from a company that no longer exists. Its contracts are void. All perfectly legal. Sorry!

## Secure path to and from user

This is also known as 'secure input and output'. Microsoft talks it up as 'a secure channel between input and video devices and the nexus' (its term for the operating system security components), so that 'data entered by the user and presented to the user cannot be read by software such as spyware or trojan horses'.

This is true, but it's not the whole story. Secure I/O hides input and output data streams from unauthorised apps in the same way as memory curtaining and sealed storage control RAM and disks.

This is certainly bad news for keyloggers sniffing for passwords, and for trojans that want to read your address book. Well, unless they're exploiting a hole in your email program (*cough* Outlook *cough*) and causing the program *itself* to do the deed. Then, you're still screwed. And malware that just wants to destroy stuff without knowing what it is will still be able to do so.

But Secure I/O is also bad news if you want to take a screenshot of a DRM-ed application. Press Print Screen, get nothing in the clipboard, and get nothing anywhere else, either; unauthorised apps, including the OS itself, are powerless to see the image data in the secure path.

This also, of course, stops applications that record streaming video, and anything else on the computer that tries to turn the output of DRM-ed software into a normally readable file. Or even just see what one Trusted application is saying to another.

## Attestation

Also known as 'remote attestation', this is basically just a reliable way to detect changes to your computer, useable by you, and by others. 'Others' includes internet servers and also TC hardware you plug into your computer, like a portable music player.

To make remote attestation work, your operating system (whose un-modified status is guaranteed by Fritz) generates a certificate that lists all of the software that's running at the moment. That certificate can be sent somewhere else over, of course, a secure path, thanks to more encryption.

So when you connect to, say, the MonsterCorp Music Store to download that latest unmissable 3.5 minutes of Justin Timberlake, the Store can be sure that you're really making the request through MonsterPlay.exe, which can be relied upon to dump the data into sealed storage.

## Fritz takes form

Fritz chips have existed for some time, and so have computers that use them. Atmel's AT97SC3201, for instance, is 100 percent Fritz, and it's part of a few IBM laptops and desktops. Has been since 2002. It doesn't *do* anything unless it's activated by software, of course, and from-the-ground-up OS support for it isn't there yet. But it will be; the Longhorn edition of Windows that Microsoft's touting will be TC compliant.

Not much is known about the AT97SC3201, but we do know that it includes anti-tampering features, as all Fritz chips must. It's meant to detect attempts to probe or intercept its communication with the rest of the system, and it definitely detects an interruption to its power supply, such as will happen if someone unsolders it. Or if the BIOS battery goes flat.

If the AT97SC3201 isn't woken up suitably politely after that happens, it'll wipe all of its stored data.

## Tightening the grip

Fortunately for those shameless scofflaws who sometimes set their VCR to record *Neighbours*, the media companies' vision of DRM can only really work if TC becomes *compulsory*.

Trusted media players can reject files with an audio or video 'watermark' that says they don't belong to you – watermarks are the best strategy the media companies have come up with to plug the 'analog hole'. Actually, Trusted players can just outright refuse to load files of unknown origin.

But non-Trusted media players will continue to play anything that isn't encrypted, and non-Trusted P2P applications will continue to make those files available to the world, and non-Trusted DVD and CD rippers will continue to allow people to make their own unrestricted files.

So, for Digital Rights Management to really rain on the parade, PCs have to outright refuse to run non-Trusted applications. The general consensus is that this would be such a huge imposition that even the great mass of ordinary BonziBuddy-installing users wouldn't put up with it.

Then again, the general consensus was that Windows 1.0 couldn't possibly ever amount to anything.

Sleep tight.

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# PCI Express yourself

Intel is finally expressing with its full capabilities, so John Gillooly takes it to our testing facilities.

Usually major new technology is introduced in steps, with nice little upgrade paths marked and a singular marketing focus on the small change designed to make our computational lives a little better. After a successful bundling of multiple technologies with Centrino, Intel has thrown our expectations out the window and launched a swathe of new technology in the guise of its new 'Express chipsets' for the Pentium 4. As the name suggests, the main feature of these chipsets is PCI Express (PCI-E).

The launch consists of three new chipsets, the high end i925X (formerly codenamed Alderwood) and the mass-market i915P and i915G, which both went by the Grantsdale codename during development. All of these chipsets throw a lot of tried and true technology out the window in favour of a range of new standards pioneered by Intel but scheduled to flow across the PC landscape over the next few years.

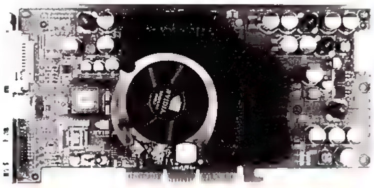
On a gross scale, these 'Express Chipsets' harken the death of some of the most beloved PC standards – with AGP, PCI, DDR, AC'97 and ATX being some of the best known. A lot of the technology requires Windows XP with at least Service Pack 1 installed, and even more power will be exposed once Microsoft develops the time machine needed to get Longhorn into the market sometime this decade.

In fact it is the sheer number of changes that make the launch of these chipsets so significant. Intel has learnt over the years that it can certainly influence the technology industry, but this influence has limits. RDRAM is a pertinent example of this. While undoubtedly a superior technology to SDRAM, its price and performance requirements meant that it faded away in favour of the AMD-sponsored DDR SDRAM memory. Intel acknowledged this fact with its i845 chipsets and it hasn't looked back at RDRAM since.

However, even if this happens with one or two technologies incorporated in the Express chipsets, the vast majority will survive to become important parts of our computing lives. There are certainly features that are currently only on the cusp of maturity, that may take a year or two to reach the mainstream in force, but the vast majority are ready for primetime now. ■

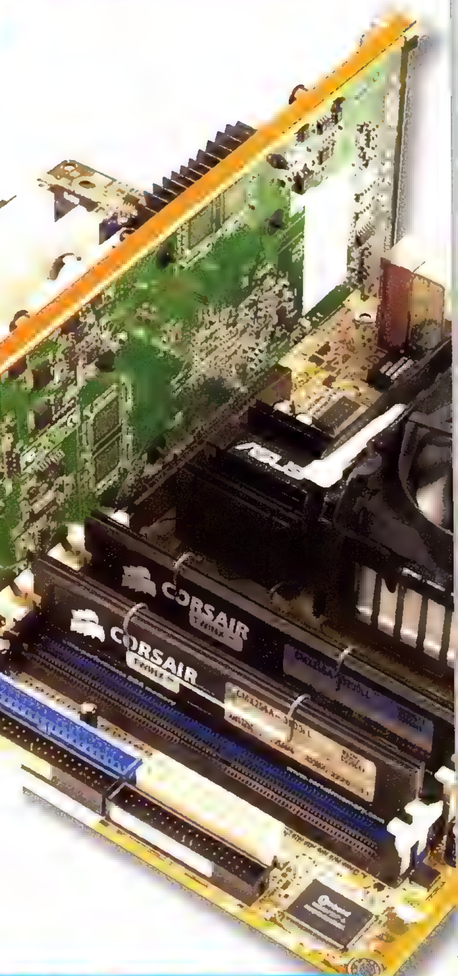
### RIP AGP

In this photo the top card has a x16 PCI Express connector and the [illegible] AGP 8x one. Both positioning and size of the connectors have changed to [illegible]

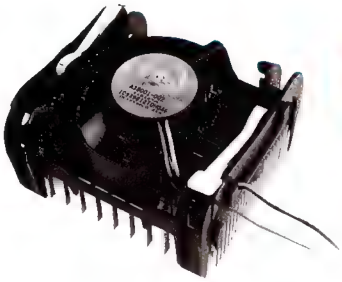


### 8x AGP graphics

This GeForce FX 5700 Ultra card is built around an identical core to the GeForce PCX 5750 on the opposite page. Because it is an Ultra variant it has a higher clockspeed, which means slightly increased performance over the PCX 5750. Motherboards using Intel's 925X or 915 chipsets will have no AGP support whatsoever.

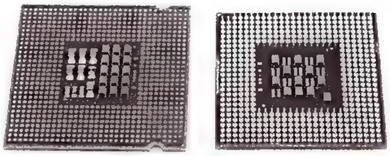


i865PE system



### 478-pin [illegible]

478-pin Pentium 4 CPUs require a fair amount of mechanical pressure to keep them in place. This means that a plastic bracket around the socket is needed for heatsink mounting. Intel's reference heatsink for 478-pin CPUs clips into this bracket and uses special clips to ensure that the correct amount of mechanical force is then applied to the CPU. The new LGA 775 socket uses a metal clamp to secure the CPU, which means less pressure is needed from the HSF mounting.

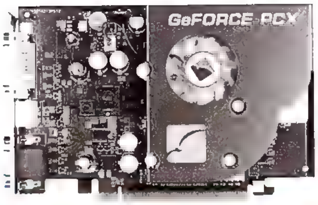


### Look ma, no pins

On the left is one of the new LGA 775 Pentium 4 processors, on the right is a 478-pin version. The new CPU has a slightly larger package to encompass the increased number of contacts on its base, and also bears two notches designed to help with installation. While the LGA 775 CPU has no pins to bend, improper insertion can possibly bend the pins inside the LGA mounting on the motherboard.

### Next generation cooling

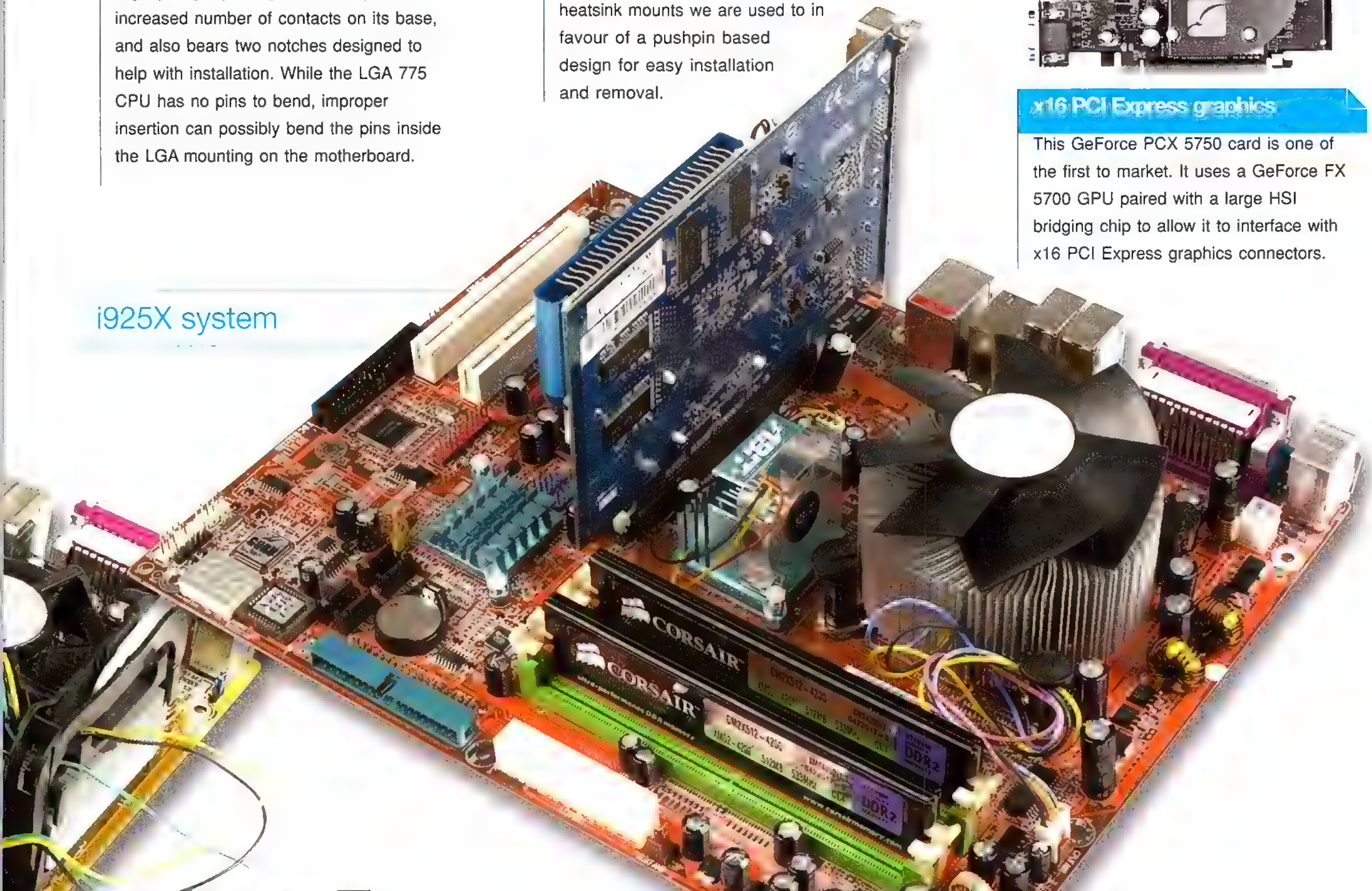
Intel's new reference heatsink design for LGA 775 CPUs throws away the plastic heatsink mounts we are used to in favour of a pushpin based design for easy installation and removal.

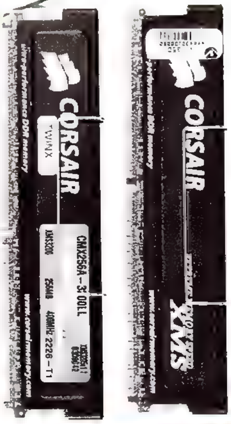


### x16 PCI Express graphics

This GeForce PCX 5750 card is one of the first to market. It uses a GeForce FX 5700 GPU paired with a large HSI bridging chip to allow it to interface with x16 PCI Express graphics connectors.

## i925X system



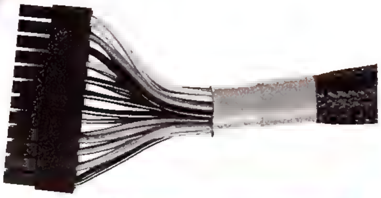


### DDR400

DDR400 is the current standard for desktop systems, and is still supported on some i915 based motherboards. Despite the debut of DDR2, DDR400 will still be around for the forseeable future.

### DDR2 533

All i925X and some i915 boards will come with 240-pin memory slots designed to take DDR2 memory. It is currently available in both 400MHz and 533MHz effective speeds and bears a performance limiting CAS latency of 4.



### 24-pin ATX power

Boards that use Intel's Express chipsets can work with 20-pin ATX power supplies, but are designed around a 24-pin power supply. This is the same connector as a standard called EPS, which is used in servers.

## i925X

In the last round of chipset launches, Intel debuted the i875P chipset for enthusiasts. This was essentially a turbocharged version of the mass-market i865 chipsets and was marked by two main differences – it supported registered DDR memory and it had a performance mode called PAT.

It never really took off, largely because most manufacturers worked out how to enable PAT on the 865 chipsets, but it signified that Intel was serious about producing high end chipsets for high end users.

Fast forward a bit and Intel has released the successor to the i875P in the form of the i925X. This chipset is the big daddy of the new generation, an intent signified in two ways. The chipset is optimised for, and hence only supports DDR2 memory and it also only supports 800MHz FSB Pentium 4 CPUs (although Intel is rumoured to be releasing a 1066MHz FSB CPU by the end of the year, which will probably just need a BIOS update to work with the i925X).

## i915P

For the vast majority of users, the i915P will be the future chipset of choice. Designed to replace the i865PE chipset, the i915P differs from the i925X in a couple of key ways. It supports both DDR400 and also DDR2 memory types, and also supports 533MHz FSB CPUs.

This makes for a much more flexible solution than the i925X, a flexibility that is already being leveraged by motherboard manufacturers to come up with more upgrade-friendly products than the i925X. The nature of this chipset means that boards can come with both DDR and DDR2 memory slots, although there is no support for AGP in any of Intel's chipsets, so only PCI-E graphics will be suitable.

## i915G

After a distinct lack of any Intel integrated graphics solution for the first year and a half of the Pentium 4's life, it is now up to its third generation of integrated solutions. Thankfully, the i915G dispenses with the oft derided Intel Extreme Graphics architecture completely, in favour of a new low end DirectX 9.0 solution called Intel Graphics Media Accelerator 900 (GMA900).

This is not a gaming focused DX9.0 product, even though it should deliver higher framerates than previous generations of Intel's extremely limp graphics. Instead the use of DX9.0 is a pre-emptive strike for Microsoft's Longhorn, which will make use of DX9.0 shaders (of which the GMA900 has one pipeline) to create the next generation of Windows desktop.

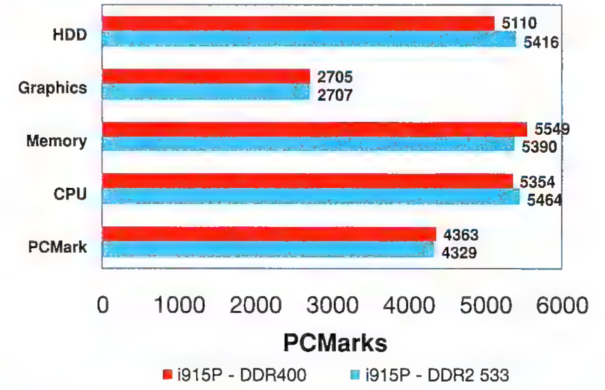
One interesting thing about the GMA900 is that it can use the x16 PCI-E graphics slot and a riser card for DVI output. Plus it goes without saying that this slot can also be used for a discrete graphics solution if the GMA900 is not keeping up with your needs.

## ICH6

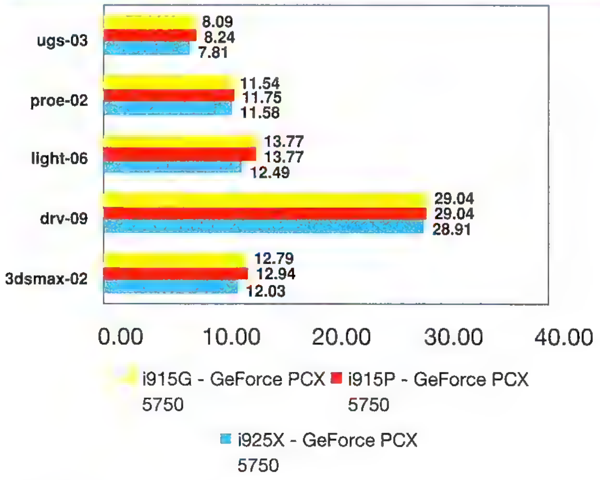
In combination with the three new northbridges, Intel has also released three variants of its new ICH6 southbridge. While the northbridge drives the CPU, memory and graphics parts of the chipsets, the southbridge contains a mother lode of funky new features.

First, it includes support for x1 PCI-E slots, as well as legacy PCI ones. While graphics hardware will transition across quickly to PCI-E, we expect that other add in products will take longer to flow through into the market, so some PCI support will be very useful for the next couple of years.

PCMark04



SPECViewperf



Next there is Intel High Definition Audio, which is the replacement for the now venerable AC'97 integrated codec. Formerly codenamed Azalia, HD Audio is set to become an industry standard, working in concert with Microsoft's Unified Audio Architecture drivers. This is one feature that requires Windows XP Service Pack 1 to function.

Also available as an option is Intel Wireless Connect technology, which is currently unusable, but will come into its own later this year. Designed to work with Intel wireless cards, this technology turns the PC into a proper wireless access point, thanks to dedicated hardware in the ICH6.

A lot of these are intrinsically related to the marketing push behind the digital home, but some are also the endpoint of long periods of development. For example, the ICH6 is a major stepping stone in the transition to Serial ATA as the mainstream desktop storage standard.

Whereas the previous ICH5 southbridge had two SATA channels and two parallel ATA channels, the ICH6 only natively supports one parallel ATA channel, and four SATA ones. There is also an ICH6-R variant that then adds native support for RAID 0, 1 and 1+0 modes. This is called Intel Matrix Storage technology.

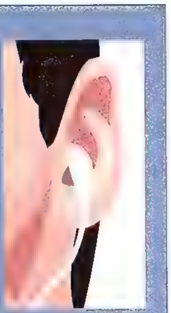
## New plugs

To get all these juicy new features up and running, there have been some significant changes to motherboard design and requirements. The most striking change is the replacement of the 478-pin socket with the new LGA 775 CPU mount. This mount contains 775 spring mounted pins, inside a metal clamping device. These pins then contact points on the underside of the now pinless Pentium 4 CPU. Once the clamping mechanism is closed the whole thing is covered by a large heatsink that clips into four holes in the motherboard.

In order to juice up the system you need the four pin ATX 12V power connector already found on Pentium 4 boards, as well as a 24-pin power plug. Normal ATX power supplies only use 20-pin plugs. You can still use these 20-pin plugs, but for maximum juiceage you need 24-pins. This configuration is not new, it has been used on server supplies for some years, so if you are unable to find a suitable ATX supply, keep an eye out for server supplies that support the EPS form factor.

Gone too is the familiar AGP slot, in its place is a thinner and longer x16 PCI-E graphics connector. This is capable of supplying 75 watts of power, which should be fine for all but the highest end graphics cards, which come with 6-pin power connectors (adaptors for these require two Molex plugs to be used).

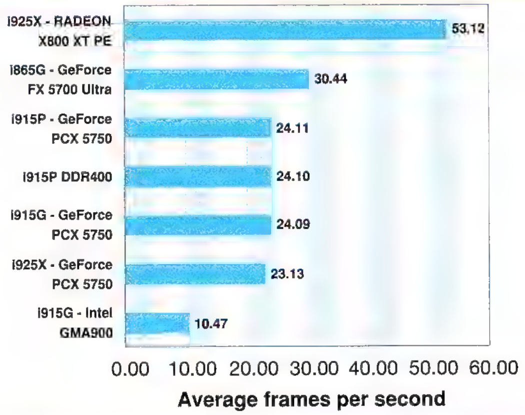
### Intel High Definition Audio



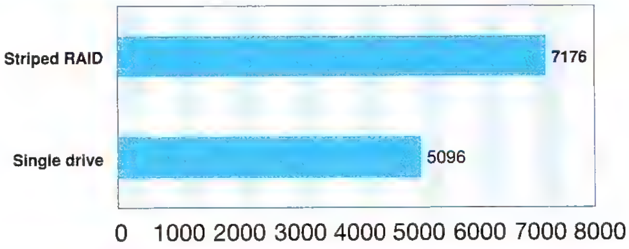
Audio codecs can be confusing things at times, and the clunkily named Intel High Definition Audio is no exception. It is a rewrite of the basic integrated audio standards, which used to be AC'97. The new standard, once called Azalia, hooks in with Microsoft's Unified Audio Codec to streamline the way PC audio works. It is attached to the whole digital home push, in that it provides much higher standards than previously expected. Most of the stats are on par with an Audigy 2, except for all that cool EAX HD stuff that creative owns. But for home theatre use it's pretty decent, and it does blow all our preconceptions about onboard sound away.

Most boards, Intel's included, use silicon from Realtek to enable eight channel audio support through an array of auto sensing plugs on the backplane. This then requires Service Pack 1 for Windows XP, a Microsoft update and the audio drivers to get the system up and running.

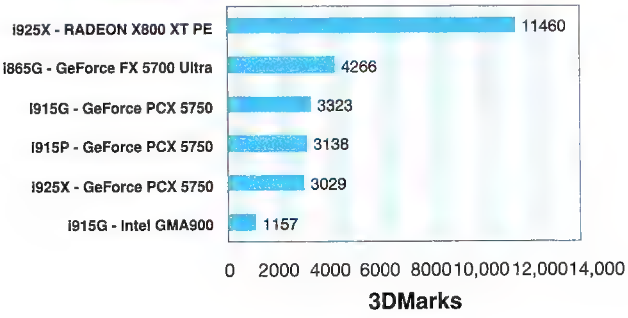
Aquamark 3 – 1024 x 768



i925X RAID performance – PCMark HDD test



3DMark03



Below the graphics slot sit two or three x1 PCI-E connectors. We are yet to come across any products that use x1 PCI-E, but down the track this is the form factor that current PCI devices will transition to. Probably the first x1 PCI-E products will be wireless cards designed to work with Intel's access point technology.

All 925X boards will have 240-pin DDR2 memory slots, while i915 boards can have either DDR or DDR2 or even a mix of both slots on them. However, the dual slot design is for ease of upgrading only, the 915 cannot run both memory types at the same time.

Most motherboards will also only have a single parallel ATA port onboard, alongside four SATA plugs. This basically forces you to use SATA hard drives with these chipsets, but we are starting to finally see SATA optical drives come on the market as the inevitable shift away from parallel ATA continues.

## Setting up

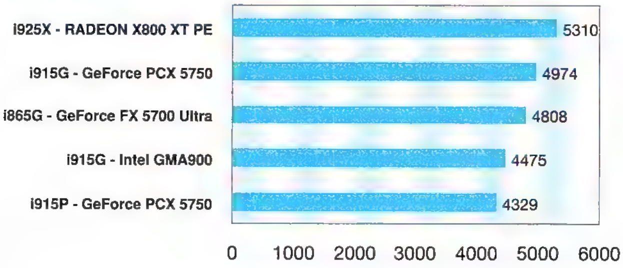
Such radical shifts in the fundamentals of the PC make for many challenges while benchmarking. Because we were working with hardware trickling off the cusp of production, but software designed for the PC as we know it, we ran into a couple of nasty compatibility issues, with SYSMark2004 (which refused to acknowledge the new Microsoft Unified Audio architecture as a sound device) and UT2003 (not recognising the CPU and graphics properly), causing failures on several test setups.

We did get a lot of benchmarks working, however, and have pitted myriad hardware setups against each other to see how they all match up. The hardware we used is outlined in the table on *page 32*. Unless otherwise stated we tested with two 512MB sticks of Corsair DDR2 running in dual channel mode, and we used the GeForce PCX 5750 as our standard video card.

All tests were carried out using the LGA 775 3.4GHz Extreme Edition Pentium 4 CPU. We used our 10,000rpm Western Digital Raptor SATA drives for everything except our RAID test, in which we used two 16MB cache Maxtor SATA prototypes that were provided by Intel.

One exception to these rules was the i865 testbench, which used ABIT's AS8 board. This is an LGA 775 supporting i865 board, which meant we could do an apples to apples comparison between chipsets using the same CPU. Unfortunately it

PCMark2004 – Overall



meant we had to make do with 512MB of DDR-400 and also use a GeForce FX 5700 Ultra card, which is slightly faster than the GeForce PCX 5750, which uses a bridge chip and a normal 5700 GPU.

Our testbenches were running Windows XP with Service Pack 1 and DirectX 9.0b. We used WHQL reference drivers where available, but understandably these products were all pre-release so we had to make use of manufacturer supplied drivers in most cases.

Out first batch of testing was with PCMark2004, firstly to get an overall comparison of the different chipsets, and secondly to see how different features performed. The comparison tests were run using a variety of setups, and showed an expected decline in performance through the product range, and highlighted how sensitive to graphics performance PCMark2004 can be.

We then ran the full PCMark test suite on the i915P board, first with 1GB of DDR400 and then with 1GB of DDR2. The graphs show some slight variation between the two memory types, with DDR400 actually scraping ahead in the memory test.

The reason for this is down to latency. DDR2 comes burdened with a CAS latency of 4, as opposed to the 2.5 latency of the DDR400 we used. Because of this, the speed boosts seen with DDR2 appear to be negated. It is for this reason that dual memory products could be the perfect solution for upgraders, spend your cash on a good video card now and go DDR2 when memory capacity demands it.

We then ran a quick test on RAID performance on the i925X. We ran the PCMark2004 HDD benchmark on striped 7200rpm SATA drives, and then on a single drive. The results were impressive indeed, showing a theoretical performance boost of 40 percent when using RAID.

Returning to the overall PCMark 2004 results we decided to see just how much performance difference there was between chipsets. Looking at 3DMark03 we see some very interesting things emerge. Last month we previewed ATI's X800 XT reference card on a 3.4GHz EE based 478-pin system and scored a tad over 12,000 3DMarks, however this time around the PCI-E RADEON X800 XT Platinum Edition comes out almost 1000 3DMarks lower. This is still the sort of performance that one would abandon one's moral standards for, but it isn't the fastest we have seen either.

What is also highly intriguing is the plateau of scores between the i915G, i915P and i925X chipsets. There is virtually no significant difference between the scores, if anything, the high end i925X comes out as the worst performer of this trio. Unsurprisingly Intel's integrated graphics sit at the low end of the scale, around the smooth Warcraft 3 level of performance.

A stunningly similar picture emerges from Aquamark 3. The graphs show performance at 1024 x 768, which was all the GMA900 could handle before operator frustration got the best of it, but the trends continue up to 1600 x 1200.

The X800 XT PE sets a cracking pace, but again the three PCX 5750 systems showed almost no performance difference. While we have not been able to isolate the bottlenecks, the gut feeling is that it is related to the high latency of DDR2 holding back any tweaks in the i925X.

To test this assumption we ran SPECViewperf, a high end graphics benchmark. We find it useful because it is great for highlighting memory performance, and in this case it showed a virtually identical picture to the other tests.

## Conclusion

There appears to be little difference between the new chipsets in terms of performance, even when running the expensive combination of i925X mobo, DDR2 memory and Extreme edition CPU. With this in mind, the i915P looks set to be the chipset that will carry us forward. The flexibility of both DDR400 and DDR2 support, combined with the comprehensive feature update that is the ICH6 southbridge makes for a great upgrade solution.

If you are looking to upgrade then everything really depends on the video card situation. It will take a little while for high end PCI- E cards to hit the market, so early adopters may find themselves faced with little choice beyond the GeForce PCX 5750 or RADEON X600, which are respectable cards but not earth shaking performers.

While there is no magical booster of performance hiding in them, there is no doubt that these chipsets support the next generation of PC technology. PCI Express and DDR2 are here to stay, and the shift towards more SATA channels puts the writing on the wall for the ribbon cable. The 'Express chipsets' are a realisation of a lot of time and effort that Intel has put into developing the next generation standards, and they are worthy examples indeed.

| Product | Chipset | Supplier | Website |
|---|---|---|---|
| Albatron i915G Pro | i915G | Albatron | www.albatron.com.tw |
| Gigabyte i915P | i915P | Gigabyte | www.gigabyte.com.tw |
| MSI 915P Neo 2 | i915P | MSI | www.msicomputer.com.au |
| ABIT AA8 DuraMAX | i925X | Altech | www.altech.com.au |
| ABIT AS8 | i865PE | Altech | www.altech.com.au |
| Gigabyte GeForce PCX 5750 | GeForce PCX 5750 | Gigabyte | www.gigabyte.com.tw |
| Albatron GeForce PCX 5750 | GeForce PCX 5750 | Albatron | www.albatron.com.tw |
| Gigabyte RADEON X800 XT PE PCI-E | RADEON X800 XT PE PCI-E | Gigabyte | www.gigabyte.com.tw |
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Close to 120,000 people attended this year's Computex show in Taiwan. John Gillooly was one of them.

Last year it was all about wireless, with one side of Taipei's New York New York shopping centre brandishing a banner that urged people to unwire their lives in the pursuit of Centrino sales. This year, 'Digital Home, Digital Life' was the simple message tied to a saccharine photo of a happy American family cavorting around their PC. Intel uses this building each year to stamp its influence on the Computex trade show, but this time its attempts at digital penetration into the home were not as smooth as one would expect.

With high level rhetoric and a small number of products championing the digital home cause, the main focus was still on the nuts and bolts of the Taiwanese hardware industry. Motherboard manufacturers were touting new product ranges for Intel's LGA 775 and AMD's Socket 939 CPUs. The VGA people were showing off a range of PCI Express solutions to go with these boards and the memory people were waving DDR2 memory around in anticipation of the Intel 925X chipset. Also, with the fierce competition experienced in the motherboard and VGA card business of late, companies were looking to diversify into new markets, ranging from LCD monitors to servers and other kooky devices.

Last year saw every manufacturer you could think of trying its hand at the small form factor market, this year there was almost unanimous agreement that, for a product to succeed, it needed to diverge from the Shuttle-influenced design that most have been based on.

But one of the most interesting things was the way in which Taiwanese industry was tackling the digital home. Companies like MSI were aggressively changing their images to appear more consumer-friendly, while others were dipping toes into the home with one or two products designed to bridge the IT-consumer electronics divide.

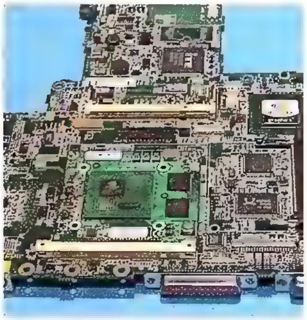
## Big guns fire

As in previous years, Intel, AMD, NVIDIA and ATI set the trends for the 2004 show. Intel didn't officially launch its LGA 775 CPU until *after* Computex, but it did take the wraps off its chipsets formerly known as Grantsdale and Alderwood, now known as the i915 and i925X chipsets at the show. AMD finally launched its Socket 939 form factor for the Athlon 64 and Athlon 64 FX, while ATI and NVIDIA unveiled new lines of graphics cards to support PCI Express.

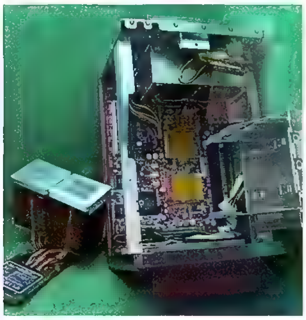
The i915 and especially the i925X chipsets are big gambles by Intel, they all shirk AGP for x16 PCI Express graphics connections and bring onboard the need for new 24-pin ATX power supplies (although some products support 20-pin supplies as well). The 925X is especially risky because it only supports DDR2 memory, while the i915 can support either DDR2 or DDR400.

**ABOVE:** These robots are now available in shops. MSI did some hardware hacking and had this one running over Bluetooth.

**ABOVE:** Albatron's Widio device uses 802.11 to stream audio digitally to the recieving box, which has a headphone jack.



**ABOVE:** NVIDIA was displaying its MXM mobile graphics form factor. This board has an MXM slot for its graphics needs.



**ABOVE:** Iwill caused a storm with its dual Opteron small form factor box. A Xeon-based system is now in the works.

These requirements have been met with a mix of optimism and scepticism. Potentially, one of the best things about these chipsets is they'll convince end users to upgrade their video cards as well. Thus, many manufacturers are looking into motherboard and graphics card bundles so they can ride the launch to profit. However, there are also concerns about the high price and low availability of DDR2 memory, and the need to upgrade multiple components holding end users back from making the jump into Intel's brave new world. Mobo makers are also quietly terrified about the RMA nightmare that hides behind the new LGA 775 socket, whose fragile pins were a source of many of our conversations with the manufacturers.

Talking to a few people, we found a similarly mixed attitude towards AMD's Socket 939 form factor. While some manufacturers were eagerly adopting the socket as the basis for their main Athlon 64 products, others were holding back after the low availability of Socket 754 Athlon 64s had already hurt them in past months.

## Death to AGP

ATI launched a top to bottom range of PCI Express solutions during Computex. This lineup was crowned by the RADEON X800 XT and X800 XT Platinum Edition VPUs, which were fundamentally the same as the AGP ones, just with the necessary PCI Express circuitry on the die. When we asked ATI about the X800 PRO, company reps told us that the PCI Express version would be OEM only, which was funny considering at least one company, ABIT, was displaying the card on its stand.

Below the X800 range are two more lines of product. The X600 is the VPU that ATI has been showing off since the Intel Developers Forum last September, and has been a major validation vehicle for Intel during the ramp up to the launch of PCI Express. It is a 0.13 micron chip based upon the RADEON 9600 architecture, and comes in two variants: the XT, which has a core at 500MHz and memory at an effective 740MHz, and the PRO, which has a 400MHz core and 600MHz memory.

More technologically interesting is the new low end X300 series, which was designed to provide a budget solution that outperforms the new generation of Intel Extreme integrated graphics. It too was based on the RADEON 9600XT architecture; however it is the first production graphics chip to use TSMC's 0.11-micron fabrication process. This continues ATI's policy of flowing new process technology into the lower end of its range, which allows it to fine tune the process in time for the next generation of high end graphics chips.

The X300 has four pixel pipelines and two vertex pipelines, but it differed from the X600 by running at a lower clockspeed (however we were excited by the overclocking potential of this little beast). Both the X300 and X300 SE models have a core clock of 325MHz and an effective memory clockspeed of 400MHz. ATI differentiates the models by using a 128-bit memory bus on the X300 and only a 64-bit bus on the X300 SE. ATI also assures us that it will be policing manufacturers to ensure that no corners are cut by using 64-bit memory on the 128-bit model.

One highlight of the ATI booth was the Serious Sam 2 demo; running to show the effectiveness of its 3Dc texture compression. It was one of those rare demos that allowed for a quick and simple comparison between the differing detail levels achieved with and without 3Dc.

But it wasn't just ATI showing off its PCI Express wares, NVIDIA had a demo suite set up showing off a range of products including the PCX series of cards that it announced several months ago. These were essentially previous generation GeForce FX cards that supported PCI Express thanks to NVIDIA's HSI bridge chip.

The series consists of three models, the GeForce PCX 5300, 5750 and 5900. It was also demonstrating the PCI Express variant of the GeForce 6800 Ultra; however the company wouldn't be drawn on when its high end products would hit the market.

We finally got a chance to see the now famous Far Cry displacement mapping demo, which showed the power of Shader Model 3.0 and featured technology that should flow on into a patch for Far Cry in the near future.

Frankly, while visually it's great indoors, it looked like crap once the demonstrator got outside. The pebbly beach was spanky up close but as soon as you looked at the first or second mip-map level it blurred into nothingness. We did ask NVIDIA about how it was with anisotropic filtering enabled, but the reps were unable to give us an answer beyond 'yeah it will obviously look better'. Suffice to say we now have some tests planned once the patch hits the net.

NVIDIA was also displaying its new MXM mobile graphics form factor, which was designed to make notebook graphics easier to upgrade. While there is debate as to whether this will end up as an industry standard, it allows for a degree of flexibility that's hard to find in other aspects of notebook design.

## Enjoying the floor show

Exhibitions like E3 are loud and bright, but nothing quite compares to pushing through the Computex crowds. At times a sea of people flow through the four halls of the show, stopping to shout out corporate slogans in the hope of winning some sort of trinket, or to watch a lovely musical interlude or dance extravaganza on a company's stand.

Ground zero for the wackiness was Hall 2, where the big motherboard and graphics card makers resided. It was centred on an intersection with AOpen, Acer, ASUS and Gigabyte all spruiking their wares; and it spread out from there.

We met with Gigabyte and dodged the noise to spend some time checking out its products. Following from its feature packed 'six dual miracle' range of boards it was showing the new 'eight sigma' range, whose standout feature was a heatpipe-based cooler for its dual power system.

In fact, cooling is becoming big business for Gigabyte. It was showing a new bracket that allowed the impressive 3D cooler range to work with the new LGA 775 socket design, and talking up the future. Without giving too much away, expect to see some more outlandish solutions coming from Gigabyte, beyond pure air cooling.

That company was also showing a solid range of motherboards, from high to low end. One of the most exciting aspects was that a number of Gigabyte's i915 boards will come with support for either DDR400 or DDR2, which will provide for a nice upgrade path for those wanting to go PCI Express.

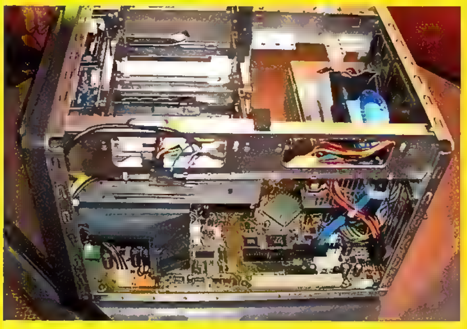
Next was ASUS, which was sporting a range of products across a lot of segments. There was a cool-looking smartphone that may or may not end up being sold in Australia – if it *is* released here, it could arrive as early as this month. There were also some other curiosities: a case that resembled those we have seen in the past from US company Alienware, and an enormous heatsink, dressed up to look like a jet engine.

Although the company had a stand in Hall 2, the real Shuttle action was happening in its VIP suite on the sixth floor of New York New York. In there we met with Ken Huang, Shuttle's VP of R&D and he gave us a detailed lowdown on the new SB95P XPC, which has been designed to cope with Intel's heat pumping Prescott core. It manages this, and fits in a 350W PSU, by being slightly larger than previous XPCs.

To ensure that the heat is managed properly, the CPU is located at the front of the case, and vents side to side. Shuttle has effectively created a tunnel that isolates the CPU from the rest of the system, which keeps things cool and quiet. It has also used the extra space to allow for two SATA drives to be installed in special brackets across the top of the system. And it sports a VFD display, which is fully customisable and fits subtly into the new black system design.

**ABOVE:** Computex is home to some of the whackiest experiments in booth babery we have ever seen. These guys in one piece red outfits were wandering around pimping Gigabyte.

Shuttle was also showing off its 17in LCD screens, which were absolutely gorgeous from an industrial design standpoint. With an aluminium tube frame, complete with handle, and a tempered glass panel protecting the screen, they were striking to look at. We were told that they'll be shipping soon, using 16ms panels, and we will get one into the Labs ASAP.



**ABOVE:** Shuttle's brand new XPC design tackles the heat problems of Prescott and also packs in a meaty 350W PSU for some serious power.

The other standout in the small form factor stakes this year was Iwill with its workstation products. The most impressive of these was a box that supported dual Opteron CPUs, thanks to some seriously chunky copper coolers and fans. For ease of use its drive bay folds out, which allows users clear access to the two CPU sockets in the box. And Iwill said that it was working on a Xeon-based model as well.

Situated next door to Shuttle was PowerColor, which had a top to bottom range of ATI-based video cards on show, complete with new heatsinks that sport rubber flanges to make them look pretty. Apart from the flouncy heatsinks, PowerColor was concentrating on building good quality cards, and rebranding itself with much more informative packaging. It also appeared to be looking at other markets, like thin client systems for office environments to reduce its corporate reliance on the quality of ATI's video card lineup.

ABIT is a recent member of the ATI fold, but it was the only company we saw that had PCI Express X800 XT and X800 PRO cards on display. It also had the next generation of its Max series motherboards, now sporting the name Duramax, on show. The guru clock was one of the more intriguing things ABIT displayed – it's a desktop mounted LCD display that goes with its new motherboards (and it will potentially work with ABIT's graphics cards as well). Attaching by USB, it had readouts for temperature and other important info, as well as buttons for on the fly overclocking and PC shutdown on the top. It looked like a nifty, functional accessory.

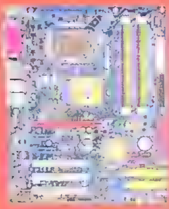
Meanwhile Albatron was demoing the new range of NVIDIA PCI Express cards as well as a range of i915 and i925X based solutions. We asked about Socket 939 and Albatron said it had no immediate plans to make boards for the product; instead it would wait until volumes of 939-pin CPUs entered the market in a few months time.

Albatron was showing one of the coolest pieces of hardware we saw, one that definitely gets the award for filling a neglected niche. It was called Widio and used 802.11 to broadcast an audio signal to a small iPod sized receiver box. This box has a headphone jack that allows you to plug any headphones into it, turning them wireless. Because it transmits digitally, there is no degradation of audio quality, and Wi-Fi makes for a longer range than the handful of other consumer level wireless audio solutions on the market. It's damn cool.

MSI's press announcement carried overtures that it was taking on companies like Sony in the consumer electronics market, with lots of marketing images of models draped over laptops and the like. But perhaps its most exciting product was a new portable video player, complete with hard drive and large LCD screen. It created a big buzz and is definitely a product we want to get into our hands on to see how well it works.

With Computex over for another year companies are getting back to the business of bringing these exciting new products to market. Some of the products we saw were rolling off production lines as the show progressed, while others were still some months away. *Atomic* will get most of the wares talked about for review as they hit the market.

Computex 2004 showed that convergence is alive and happening, but by no means is Intel the sole keyholder to the digital home. With exciting new entries in nearly all parts of the industry, the outlook is bright.



## PX915P Pro Intel® 915P + ICH6 chipsets

- Supports Intel® Pentium® 4 Processor (Prescott)
- Socket 775 with FSB 533 / 800 MHz
- Supports Dual Channel DDR400 Memory
- Supports 1 x PCI Express x 16, 2 x PCI Express x 1, 3 x PCI Slots
- Supports 8 Channel Audio
- Supports Marvell Gbit Ethernet LAN & VIA 10 / 100 Ethernet LAN
- Supports 4 Serial ATA150 Channels
- Supports IDE RAID 0,1 / ATA133
- Supports 8 x USB 2.0

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- Socket 775 with FSB 533 / 800 MHz
- Supports Dual Channel DDR400 Memory
- Supports 1 x PCI Express x 16, 2 x PCI Express x 1, 3 x PCI Slots
- Supports 8 Channel Audio
- Supports Marvell Gbit Ethernet LAN & VIA 10 / 100 Ethernet LAN
- Supports 4 Serial ATA150 Channels
- Supports IDE RAID 0,1 / ATA133, Integrated 3D Graphics Engine
- Supports 8 x USB 2.0

FSB 800 Dual LAN Serial ATA PCI Express

## PC5750 / Q

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- 128MB, 128bit / 256MB, 128bit DDR Memory
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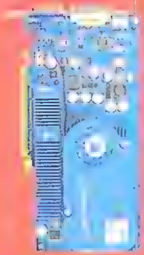
- CineFX™ 2.0 engine supports Microsoft® DirectX® 9.0 & OpenGL1.5
- Intellisample™ HCT, UltraShadow™, nView™ multi-display technologies
- Bundled DVD Player software and PC games

NVIDIA G-FORCE PCX 5750

DVI nVIEW TV-OUT PCI-Express



## PC5900

- NVIDIA® GeForce™ PCX 5900 GPU
- 128MB, 256 bit DDR Memory
- Innovation PCI Express with D-Sub / TV-Out / DVI ports
- CineFX™ 2.0 engine supports Microsoft® DirectX® 9.0 & OpenGL1.5
- Intellisample™ HCT, UltraShadow™, nView™ multi-display technologies
- Bundled DVD Player software and PC games

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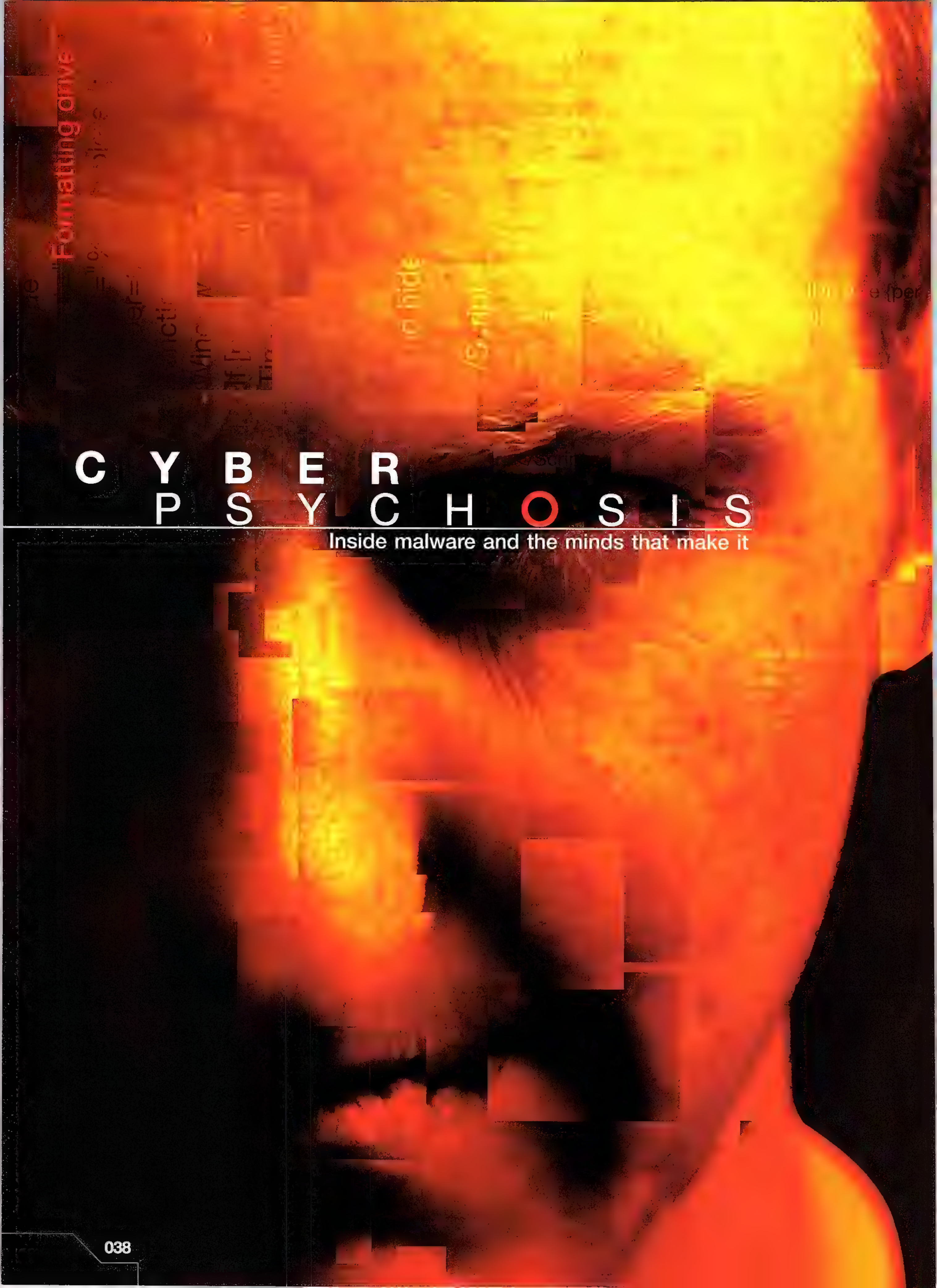


# CYBER PSYCHOSIS

Inside malware and the minds that make it

**Today's online world faces an evolving, shadowy epidemic – one that every day looks to break free from its delicate digital quarantine. Logan Booker goes into the mind of the modern virus writer to unveil the secrets that lie within.**

One of the more bizarre facets of today's economy is the 'industry of fate', where a company can make money on catastrophic but unlikely events. This industry goes by the more common name of 'insurance', and it is an integral part of our debt-based economy, much like banks, accountants and Rupert Murdoch.

Believe it or not, companies such as Symantec, Sophos and Computer Associates are also in the business of shafting fate, with products such as firewalls and anti-virus scanners. These programs protect against viruses that may hit, and attacks from hackers that might never occur.

The difference between your typical insurance policy and network security is that you're a thousand times more likely to fall victim to the latest email worm than say, drive your car into someone's house or drop your hair curler into your bathtub. Ironically, a business will invest more in property or liability insurance rather than a firewall or anti-virus scanner – perhaps because the loss of tangible business assets is perceived as more crippling than a virus infection.

This however, is a particularly weak sentiment in the age of global connectivity, considering last year's Blaster worm cost businesses worldwide an estimated US$500 million in damages.

What makes this situation even more comical is that there isn't some veteran, 40-year old computer whiz behind worms such as Blaster – here it's just an 18 year-old kid. A kid still in high school; still looking for the ideal job, passing time by wreaking his own special blend of havoc on the online world. Inexperience makes people like this blind to the repercussions, short of proving themselves to a group of equally immature-minded individuals. What could possibly motivate these young people to create viruses that clog email servers, cause systems to shutdown, knock out websites such as Yahoo, Microsoft and Google, and, most disturbing of all, make them money in the most unethical of ways?

## Phat and sassy

May this year saw the arrest of 18-year old German, Sven Jaschan, the creator of the infamous Sasser worm that violated millions of internet-connected PCs back in April. Jaschan, who coded the worm in the basement of his parent's house, is also allegedly involved with Skynet, the group of virus writers responsible for the Netsky worm discovered a few months ago, in March. While Netsky spread 'slowly' via email and contained a payload (a timed denial of service attack), Sasser was many times more virulent and spread quickly – but had no actual payload. Despite this, Sasser received considerable media attention – not to mention the eyes, ears and elite disassembling skills of virus software vendors and, of course, Microsoft. Jaschan's notoriety however came at a price: he faces an uncertain future at the hands of German authorities, not to mention several large corporations whose online businesses were hampered by his 'test' virus. It's believed he was double-crossed by his underground compatriots.

In August 2003, Jeffery Lee Parson, responsible for coding the second variant of the highly infectious Blaster worm, Blaster-B, was also arrested for his cyber crimes. Like Jaschan, he was 18 years old. However, Parson had no one but himself to blame for his arrest. Code within the variant he wrote not only connected to his own website, but also contained references to his online nickname. In this case, Parson took pre-existing viral code and made his own changes. This is an example of a typical virus writer – while they may have a hand when it comes to coding, they're not the sharpest knives in the drawer, relying on what's already available to craft their careers as internet terrorists.

Unfortunately for Parson, it is not an easy career. 'The skill required to write a "successful" virus is quite high,' says Daniel Zatz, Computer Associates' senior security consultant for Australia and New Zealand. 'While most viruses appear to be written by "script kiddies" who generally pinch ideas and code from other authors and then add their own touch to it, the really malicious viruses and worms require in-depth knowledge of operating systems and applications.

'Sometimes one virus author may not know enough to write a virus alone and will team up with someone else in the underground world [that] does have the necessary skills to complete the virus,' says Zatz.

While it's likely Parson will be remembered as a 'script kiddie', Jaschan has forever been immortalised by his father who, on hearing what his son had done, asked: 'Sven, you didn't do anything stupid, did you?' Obviously, Jaschan did not believe what he was doing was stupid – at the time at least – otherwise it's unlikely he'd have done it. This leaves us with the question of 'Why?', and the answer goes deeper than just a simple case of an attention-seeking teen.

## The usual suspects

'There hasn't been a lot of research done into the motivations of a virus writer. However, it appears the motivations are changing,' says Zatz. 'Three years ago, the primary motive seemed to be the thrill experienced from writing a program that caused damage and exploited a vulnerability.'

## Virus definitions

While the way in which malicious code works and the purposes it serves have changed over the years, the definition of what is a virus, worm or trojan has not.

'By definition, a virus is a program that self-replicates,' says Computer Associates' David Zatz. 'In other words, it tries to create multiple copies of itself either on a single computer or multiple computers.' Considering that replicating code serves little purpose in a legitimate application, the term 'virus' is very appropriate. Viruses can do a number of things, ranging from simply taking up resources to delivering destructive payloads.

Worms are a type of virus. 'Technically speaking ... a virus that copies itself from one computer to another is referred to as a worm,' says Zatz. What differentiates them is their ability to spread independently. A virus tends to latch on to another bit of code – usually a program – and must do so in order to replicate. A worm on the other hand is often a piece of self-sustaining code that can infect and replicate by itself. Right now, worms are the most common type of virus.

Finally, there are trojans. Trojans typically do not replicate and must be 'injected' manually into the host machine. A Trojan will then allow the would-be hacker to gain access to the infected system easily, using a 'back door', and the trojan itself can record keystrokes, search the system for addresses, banking details and other important information, or allow the system to be used as a mailing proxy or 'zombie' PC in a denial of service attack. It's important to note that some trojans spread using worms, such as the Mitglieder Trojan that spread via variants of the Bagle worm.

Although the term 'virus' was made popular by Fred Cohen in his article *Computer Viruses — Theory and Experiments* back in the early 1980s, the name itself was coined by Len Adleman, inventor of RSA encryption.

It's a mindset comparable to that of a modern-day vandal, and indeed, this is what many computer security professionals see virus writers as. '[They are] no different to graffiti artists.'

Looking back at the history of computer viruses, it's possible to see some definite trends for the motivations of virus writers at the time. In the beginning – a period spanning the five years between 1981 and 1986 – viruses were nothing more than experimental bits of code. Their effects were mundane and their ability to replicate limited. According to various virus histories, the first ever recorded virus, called Elk Cloner, was for the Apple II computer and spread on operating system floppy disks. Elk Cloner displayed a simple rhyme on the infected system's screen and contained no payload.

It wasn't until 1986 that the world saw its first real virus, christened '(c) Brain'. (c) Brain also went under various other aliases including '(c) ashar', and spawned variants such as 'Ohio' and 'Den Zuk'. All were based on the same code written by Brain Computer Services, a company in Pakistan – a fact verified by unencrypted text contained within the virus. No one knows for sure what the purpose of the virus was, other than it infected MS-DOS boot sectors. Like Elk Cloner, it was not destructive. It did exhibit 'stealthing' capabilities, and would hide itself from view, if for some reason the boot sector was examined.

The year 1987 saw the first file infectors; in 1988 the Morris worm was released into the wild and brought parts of the internet to its knees. Trojans made their debut in 1989; and from there, virus numbers began to increase. Concept, the first macro virus for Office, reared its head in 1995. The viral horror of today – the mass-mailing worm – was born in 1999 in the form of Melissa.

Distribution methods, techniques and payloads have changed over the years. Perhaps the most memorable are macro viruses, which were particularly virulent thanks to their cross-platform nature. Due to a combination of changes in Microsoft's Office suite of applications, and user education, macro viruses are almost a thing of the past.

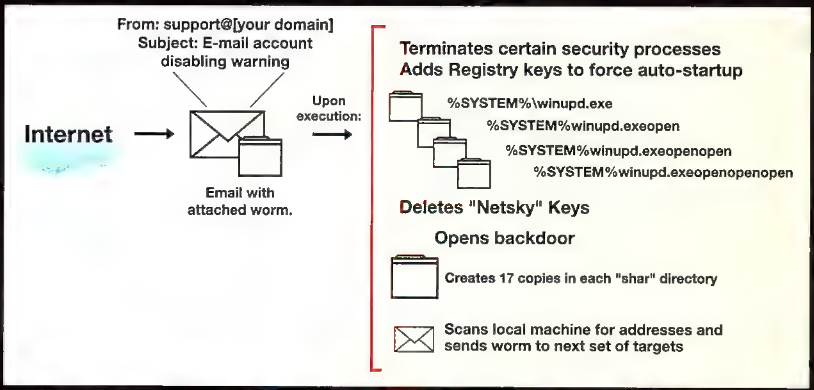
Early in their history, most viruses were mischievous and non-destructive. About six years ago, they started deleting and corrupting files. Today, they are perhaps at their most malevolent – stealing personal information, hijacking systems, and causing millions of dollars worth of damage to businesses. Worst of all, virus writers are starting to make money from their craft, an unheard of phenomenon until now.

In short, they have grown up.

## Cash for crashes

'The stereotypical profile of a virus writer is an 18-25 year old male with a Mohawk, nose ring, drinks too much Coke and has an overpowered computer with too much time on their hands. While this may be true in some cases it isn't always,' says Zatz.

Thirty-three year old network programmer David Smith, author of the first mass-mailing worm Melissa, never intended for his virus to be destructive. Nor had he planned to gain anything financially from it; indeed, Smith was eventually fined US$5,000 for his crime. This did not change the fact that the virus caused an estimated US$80 million worth in damages, simply because it


From: support@[your domain]
Subject: E-mail account disabling warning
Internet
Email with attached worm.
Upon execution:
Terminates certain security processes
Adds Registry keys to force auto-startup
%SYSTEM%\winupd.exe
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%SYSTEM%winupd.exeopenopenopen
Deletes "Netsky" Keys
Opens backdoor
Creates 17 copies in each "shar" directory
Scans local machine for addresses and sends worm to next set of targets

**ABOVE:** Inner workings of Bagle.M, just one of the 26 known variants of the worm. Bagle.M not only infects the user's system and spreads via email, it also copies itself to peer-to-peer sharing directories and masquerades as a legitimate file. It was around this variant that Bagle started 'disinfecting' systems of Netsky.

## Have infection, will travel

Before the days of the information superhighway, virus writers had to rely on floppy disks and hard drives in order to propagate. These days, the net provides the perfect medium for viral infection. Back when this wondrous logistical solution didn't exist, viruses had to employ various methods in order to avoid detection and to spread — a few of which we still see use today.

The easiest way a virus can increase its longevity is by hiding itself. Commonly referred to as 'stealthing', a virus will 'look out' for telltale signs that it is being examined, such as when certain programs load or particular system calls are made to the operating system. More sophisticated viruses can detect that they are in a debugging or disassembling environment – a dead giveaway that someone is trying to see how the viral code works. Upon sensing this, a virus can try to hide itself, pretending to be a legitimate program or even go as far as to attack the system trying to debug it. This type of stealthing, which tries to foil attempts to take the virus apart, is called 'hardening'.

Viruses can also be 'polymorphic' – that is, they change their structural appearance while retaining the same functionality. This is designed to fool virus scanners, which rely on matching patterns to detect infections. 'A simple case: a virus implements another layer of code on top of its normal functional code and encrypts the main virus body ... The encryption with variable "keys" enables a virus to look different in each generation or each new infected file,' says Jakub Kaminski, anti-virus research manager at CA's Richmond Development Lab in Victoria.

An important fact is that most polymorphic viruses do not have the capacity to create entirely new code. 'These viruses "do not rewrite themselves", but simply follow the pre-defined program,' says Kaminski.

A common misconception is that viruses cannot damage hardware. The infamous CIH virus could irreparably damage the Basic Input/Output System (BIOS) chips on motherboards, rendering the entire board useless. Thankfully, these sorts of 'destructive' viruses a rare today, with virus writers focusing more on 'phishing' viruses – those that reveal or find out banking details, or trick users into providing other delicate information.

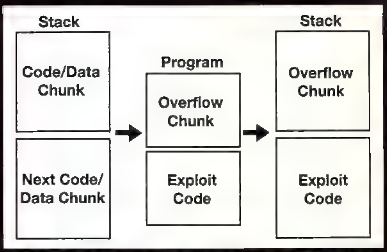
More and more, viruses are using 'multiple vectors' to infect computers. Code Red, for example, not only made use of its own mailing engine to spread, it also sent itself via HTTP requests and infected machines running Microsoft's Internet Information Service, taking advantage of a buffer exploit in the software. Older viruses, such as Junkie, were also multi-vector on a smaller scale. Junkie would infect a system's boot sector, memory and COM executable files, making it highly virulent for its time. Boot sector viruses and file infectors are rare today – you could say modern viruses writers have evolved beyond them.

clogged up mail servers and made working online impossible for many businesses. Like Sasser, Melissa contained no actual payload.

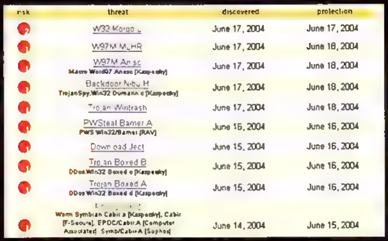
'Some viruses don't contain destructive payloads ... however, they perform other actions that are deemed malicious such as [attacking] a website. For example, the MyDoom virus earlier this year [2004] caused infected machines to launch a distributed denial of service (DDoS) attack on Microsoft's update website: windowsupdate.com,' says Zatz.

What's disturbing is that, while mass-mailing worms such as Melissa started out as 'benign', or even briefly malignant, as in the case of MyDoom and Code Red, today authors of malicious code are making money from unlearned, and even misinformed users. 'Recently ... the motives of a number of virus writers have changed and there are financial incentives. For example, the MiMail worm that infected computers last year [2003] carried a message telling people that their PayPal account had expired and they needed to run an application (attached to the email) to reactivate their account,' says Zatz.

'Instead of sending the account details to PayPal, the details were actually sent to the virus writer who was then able to log into the victim's account and use it.'



**ABOVE:** A simplified diagram of a buffer overflow exploit. To the left is the 'clean' stack. The program code containing the oversized buffer data is run, causing the program to crash. The exploit code directly after the overflowed data contains a return 'address' that contains the viral code, which is now in the stack and can be executed.



| risk | threat | discovered | protection |
|---|---|---|---|
| ● | W32.Korgo.L | June 17, 2004 | June 17, 2004 |
| ● | W97M.MLHR | June 17, 2004 | June 18, 2004 |
| ● | W97M.Anesc<br>Macro.Word97.Aneso [Kaspersky] | June 17, 2004 | June 18, 2004 |
| ● | Backdoor.Nibu.H<br>TrojanSpy.Win32.Dumaru.e [Kaspersky] | June 17, 2004 | June 18, 2004 |
| ● | Trojan.Wintrash | June 17, 2004 | June 18, 2004 |
| ● | PWSteal.Bamer.A<br>PWS-Win32/Bamer [RAV] | June 16, 2004 | June 16, 2004 |
| ● | Download.Ject | June 15, 2004 | June 16, 2004 |
| ● | Trojan.Boxed.B<br>DDos.Win32.Boxed.e [Kaspersky] | June 15, 2004 | June 16, 2004 |
| ● | Trojan.Boxed.A<br>DDos.Win32.Boxed.d [Kaspersky] | June 15, 2004 | June 16, 2004 |
| ● | [illegible]<br>Worm.Symbian.Cabir.a [Kaspersky], Cabir [F-Secure], EPOC/Cabir.A [Computer Associates], SymbOS/Cabir.A [Sophos] | June 14, 2004 | June 15, 2004 |

**ABOVE:** For every virus released, there are some 20 variants based on the same code or exploit. Visible here in purple is the EPOC.Cabir, the world's first mobile phone virus, discovered by Kaspersky Labs in June. It spreads using Bluetooth wireless technology.

MiMail is just the tip of a rather large iceberg. Many worms, including Bagle, and more recently Xombe and Korgo, install 'back doors' into the systems they infect, so that they can be used at a later date. For instance Korgo, after it has infected a system, will try to connect to a number of Internet Relay Chat (IRC) servers. Once it has connected, it can join a channel where the virus writer can monitor and send commands to the infected system. Systems used in such a manner are called 'zombie' PCs – unknowing servants infected with a virus that leaves them at the beck and call of a greater power. It's all very Daleks and *Dr Who*.

The advantages of such a setup are numerous. The virus writer can access information on the user's system; infected computers can be used to perform a DDoS attack on a website; the systems can be used to mass-mail the virus to other systems; and, perhaps worst of all, the virus writer can sell lists of internet addresses (IPs) of infected systems to less-than-honest companies, who can then use those IPs as mass-mailers, to send spam for goods and services that the recipients almost certainly have no interest in. As systems are disinfected, the lists change, other computers contract the virus, and the cycle continues.

## Genocidal viruses

Thanks to Netsky, Bagle and MyDoom, virus activity in the first half of 2004 exceeded that of the entire year of 2003. In fact, AusCERT's 2004 Computer Crime and Security survey shows that the number of Australian businesses that have suffered financial loses from attacks from viruses rose by almost 15 percent, over 2003. 'There were about twice as many serious worm and virus hybrids in circulation between January 2003 and Feburary 2004 ... than for the previous survey period,' it goes on to say.

While all three viruses used a similar means to spread – mainly Simple Mail Transfer Protocol (SMTP) mailing engines – it is not all they share in common. 'One phenomenon we have seen recently is one virus removing another one if it exists. Some of these were dubbed good viruses; however, that is far from the truth,' says Zatz.

'The majority of the time when a virus searches for and removes another virus, it is because the author doesn't want the old one to interfere with their own creation. The authors of MyDoom and Netsky viruses, which have been so prevalent in 2004, appeared to be waging a war against each other at the expense of the internet community.

'To date, there are over 20 variants of each of these viruses and in most cases, one would try to remove the other,' says Zatz.

Bagle, when it was released, also attempted to remove traces of Netsky, and vice versa. The 'D' variant of the Blaster worm, called 'Nachi', would not only remove other variants of Blaster, it would also patch the user's system so it could not be re-infected. 'A more recent example is the Sasser worm. Sasser exploited a vulnerability in Microsoft Windows and left a copy of itself on the infected computer. Another virus called Korgo looks to see if the file left by Sasser exists and, if so, it is deleted. The reason for this is because both viruses exploit the same vulnerability in Windows and therefore potentially would interfere with each other,' says Zatz.

## Bluffing buffers

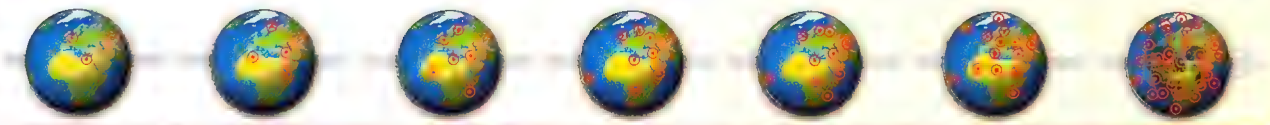
According to the AusCERT survey, the number of businesses that were victimised by operating system and software exploits jumped by 31 percent between 2003 and 2004, making exploits such as buffer overflows by far the most popular way to infect a user's system. Buffer overflow exploits however are extremely fickle.

Making use of a buffer overflow requires detailed knowledge of the product you plan on exploiting, as well as an idea of what can be done once the exploit is successful. This is one of the reasons why most virus writers use pre-existing, tested viral code – so they can spend more time programming the virus itself.

First, the virus writer must find an 'unchecked' buffer – a space in memory allotted for a certain chunk of information whose size in memory is not monitored for inconsistency. Then, the writer has to guess how large the buffer is and, byte by byte, fill that buffer until it overflows, usually causing the host application to crash. Once this happens, the writer can insert their own code, which will be run in place of legitimate code. Where the application is located in memory will determine how much work the virus will have to do in order to perform tasks on the user's system. For example, if the exploited program is responsible for changing user information, then it's a good bet that all the necessary program files will be loaded to make those changes. This means the virus will be smaller, faster and more efficient as it doesn't need to load these files.

One of the smallest viruses of recent times, Slammer, was a mere 376 bytes in size and took advantage of a buffer overflow exploit in Microsoft's SQL Server. It was transmitted by a single User Datagram Protocol (UDP) packet, and was global in the space of 10 minutes after its release.

## The history of computer viruses



| 1981-1986 | 1987-1990 | 1991-1995 | 1996-1999 | 2000-2001 | 2002-2003 | 2004- |
|---|---|---|---|---|---|---|
| World's first virus, (c) Brain discovered; virus experiments conducted; first ever trojan, PC-Write, is released as a legitimate program. | File infector Lehigh is in the wild; first virus BBS goes online. Morris internet worm kills parts of the internet. CERT responds. | Tequila, the first polymorphic virus is discovered. The first Macro virus, called Concept, is found. First Win95-specifc viruses released. | Strangebrew, the first everJava virus is released. Back Orifice, the first user-friendly trojan is made available. Melissa strikes. | Wave of mass-mailing worms, including Love Letter and Nimda, begins. VBScript viruses arrive in force. First Palm PDA virus. | First C# virus. First SWF infector. Blaster, Slammer, SoBig and Nachi hit servers and users alike. SMTP viruses are everywhere. | Sasser, Bagle, Xombe and Korgo spread with amazing speed. First mobile phone virus appears. Future attacks will be even worse. |

Blaster, perhaps the first virus to introduce the internet at large to the buffer overflow exploit, abused a vulnerability in Microsoft 2000/XP's Distributed Component Object Model – Remote Procedure Call (DCOM RPC) service. Infected users would be presented with an error, informing them the service had crashed and the system needed rebooting. This was actually a side-effect of the exploit, and not a function of the virus – but it might as well have been for the trouble it caused. Blaster was highly infectious, as all a user needed to 'catch' it was a live, unprotected internet connection.

Sasser, like Blaster/Lovsan, took advantage of a buffer overflow exploit in Microsoft's Windows 2000 and XP operating systems, in this case in the Local Security Authority Subsystem Service (LSASS), as reported in Microsoft's MS04-011 security bulletin. LSASS is an OS service responsible for user logins and login security. Sasser infected other machines by sending itself via the File Transport Protocol, or FTP, and required no interaction by the user to spread, in much the same way as Blaster. It executed the code it needed to run by exploiting, and subsequently crashing, the LSASS service.

Microsoft is very aware that many of its programs are the target of these exploits – so much so that it has plans to release its own anti-virus software. The soon to be released Service Pack 2 for Windows XP will include a much improved firewall, on top of any other patches for vulnerabilities that will included in the update itself.

## The random menace

The act of breaking down a virus until it is a whimpering, naked form made up of quivering ones and zeros is a job that requires immense amounts of concentration, patience and knowledge. According to Jakub Kaminski, anti-virus research manager at Computer Associates' Richmond Development Lab in Victoria, the hardest aspects of a virus to figure out are its origins, the purpose of its code – especially the sections unrelated to its replication or payload – and getting the code to work in lab conditions, as many viruses need to be 'spoon-fed' in order to work. In addition to discovering how a virus works, reliable methods of removal need to be worked out. Viruses that have multiple vectors of infection, modify user files and the registry, hide, or exploit vulnerabilities, make disinfection difficult – especially the last point, as an unpatched system can easily become re-infected.

### Pattern recognition

Anti-virus software actually has a great deal in common with a biological immune system.

An anti-virus program scans your system using a list of known infections, much like the body's arsenal of antibodies. It searches for sequences specific to each virus, and then takes action appropriate to remove the virus. These 'patterns' are created using a part of the viral code, and, like being injected with dead viral cells as part of an immunisation shot, so too does your scanner get updated with new virus definitions.

It's scary to think that there are code sections of some 80,000 viruses sitting on your hard drive, right now, if you run an anti-virus program. Of course, this info is encoded in such a way that it is inert, and could never function without its other components.

Many viruses are smart; they will fend off attempts to be dissected. According to anti-virus firm Sophos, almost 30 percent of viruses in the wild have innate 'hardening' that prevents anti-virus researchers from discovering their true nature. Hardening techniques include: pretending to be dormant, performing differently, or simply employing encryption or compression to obfuscate code. On top of this, viruses can exhibit different types of behaviour as a normal part of their operation, effects triggered by dates, virus generations or system settings. It is also common for a virus to shut down anti-virus and firewall applications, to increase its chances of remaining undetected and to make further incursions possible.

Anti-virus researches have a number of tools at their disposal. Perhaps the most important of these tools is the venerable VMWare. Using this software, researchers can emulate almost any operating environment. An infected virtual machine is much easier to manage than a real one, and often researchers cannot afford to have hardware systems fall prey to a virus they're working on. Researchers will also enlist the aid of disassemblers and debuggers, including IDA and SoftIce, in order to look at the internal functions of the virus and follow each step of execution.

Although it does not happen often, researchers will also write their own specialised tools – for example, to decrypt viral code or to trick a virus into executing a certain code path.

Many of today's viruses are 'multi-part', and use multiple techniques to launch themselves. 'When we talk about modern "multi-part" viruses we usually mean the viruses that consist of, and rely on, different parts (usually different types of code) for their full functionality,' says Kaminski. 'For example, a binary Win32 virus [one that works under Windows] may create a VBS [Visual Basic Script] in order to mass-mail itself ... [or] create an IRC script in order to spread via mIRC [a popular IRC client].'

## The human element

It's hard to believe a single person could be responsible for an elaborate scam, such as the MiMail virus, that in the real world would require the cooperation of many people. Skynet, the group behind Netsky, has shown that some virus writers are organised and strive for goals beyond what many have come to expect. 'There are virus writing organisations ... although they aren't your typical organisation. They don't meet regularly (at least not in person) and in a lot of cases, they have never met their fellow authors. The internet allows them to exchange code with each other anywhere in the world. Some of the members of these groups write viruses by themselves as well as with the group,' says Zatz.

Not even the most up-to-date virus scanners, hardest of firewalls or vigilant of system administrators can stop the average employee from double clicking an attachment and releasing a virus onto a company network. These sorts of defences are useless if a virus is introduced 'behind' them. Notebooks; USB thumb drives; wireless devices – all are possible entry points for an infection, and are often overlooked. To dredge up an appropriate cliché: A chain is only as strong as its weakest link. Zatz believes the overriding 'comfort factor' that comes with installing such security applications as anti-virus software is to blame for a lack of user caution. 'People don't understand the concept of a firewall [for example],' he says.

'We often look to blame the software vendors for making bad software that is vulnerable to these viruses, [but] the reality is that human beings are probably the biggest vulnerability due to our inherent curiosity,' says Zatz. 'Viruses such as Bagle, which was the first big virus of 2004, didn't exploit a single vulnerability in any software. Instead, it took a leaf out of social engineering and tempted users to run an application that was attached to the email ... Only a very small number of email viruses can spread without user intervention.

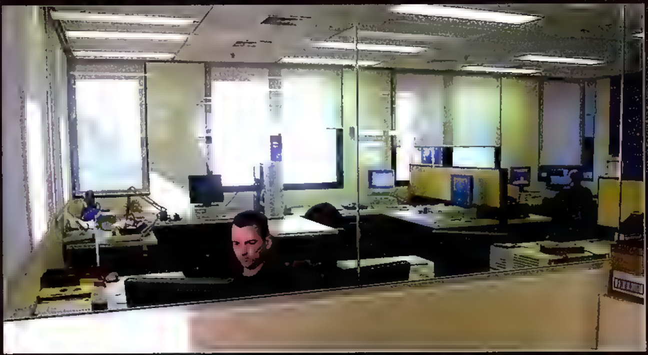
'Most need the user to double click on an attachment to launch the virus, so the skill of the virus writer is to be able to sufficiently tempt people to open the email and run the attached program,' says Zatz. 'Because of this human element, virus writers have a much easier job than they should.'

## Spy where?

A fine line exists between spyware and trojans, and spyware should not be mistaken for a virus. 'Spyware is not a virus,' says Kaminski. 'For a virus to be a virus it has to replicate.

'It would be great if all users and professionals [could] agree on what spyware really is. The same goes for adware. We don't even have a common understanding of what a trojan is. Frequently a trojan to one person is just a utility to another,' Kaminski says.

Take CWS.Realyellowpage – as it is identified by www.spywareinfo.com – a piece of spyware that borders on being a virus/trojan. CWS.Realyellowpage, unlike your average spyware application, does not appear in normal process lists (a raw list of running programs), and cannot be shut down. It comes with no uninstall function, hijacks Microsoft's Internet Explorer browser and constantly redirects the user to the same four websites. The spyware loads itself as a module within Internet Explorer and hides itself from even the most learned of users. This activity is almost parallel to that of a virus – except CWS.Realyellowpage does not replicate or spread, outside of 'injection' by another website. So what side of the line does it fall on?



**ABOVE:** Sophos' high-tech lab in Sydney, where the never-ending war on viruses is fought. These mild-mannered computers house some of the most infectious viruses known – and it's up to dedicated teams of coders to take them apart, figure them out, and find a way to purge them.

'There's a huge grey area, which contains all malicious and unwanted applications that don't clearly match definitions of viruses or trojans,' says Kaminski. '[It's] no surprise they are often referred to as "greyware".

'Spyware and adware generally fall into the "unwanted application" [category]; however, the fact that much of this software requires user agreement and cooperation to install is often conveniently ignored,' says Kaminski.

## Future wars

Again, we come back to the motivation, which according to Zatz is evolving into something much more involved than your run-of-the-mill ego trip. 'The incentive for virus writers and hackers to write malicious code is changing and they are becoming more motivated by the money they can make, rather than the peer recognition that motivated them previously,' he says.

'[Recently], I read an article about a hacking group in Russia advertising on the internet that, for a fee, they will perform a DoS attack on any web server you like.'

If this isn't disturbing enough, the world's first mobile phone virus was discovered just a few weeks ago. EPOC.Cabir infects Bluetooth-enabled devices running the Symbian/EPOC operating system. It can travel to almost any device that makes use of these technologies, including objects as mundane as printers. The virus itself contains no payload – much like Sasser it is a proof-of-concept. But how long will it be until we're rebooting our 6210s and buying anti-virus software for our inkjets?

'Just like anything that is created, there are good and bad ways to use things. Technology is no different. As new breakthroughs are discovered in the way technology can improve productivity, efficiency, profitability and life in general, there will always be someone who can discover a way to exploit this new breakthrough for malicious or selfish purposes,' says Zatz.

'We will see viruses start to target wireless networks more and more, and there will be viruses targeting critical infrastructure. While we would like to think that critical infrastructure should be secure, the reality is that the majority of it is not owned by the government, but rather by private enterprises and therefore, securing these environments is difficult – to police and control.

'We are in the information economy,' says Zatz. 'My belief is that we haven't even seen the "most potent virus ever" yet. As technology evolves, so will the determination of the virus writers to create bigger, better and badder viruses.'

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Thanks to Daniel Zatz and Jakub Kaminski from Computer Associates and Sean Richmond and Paul Ducklin from Sophos.

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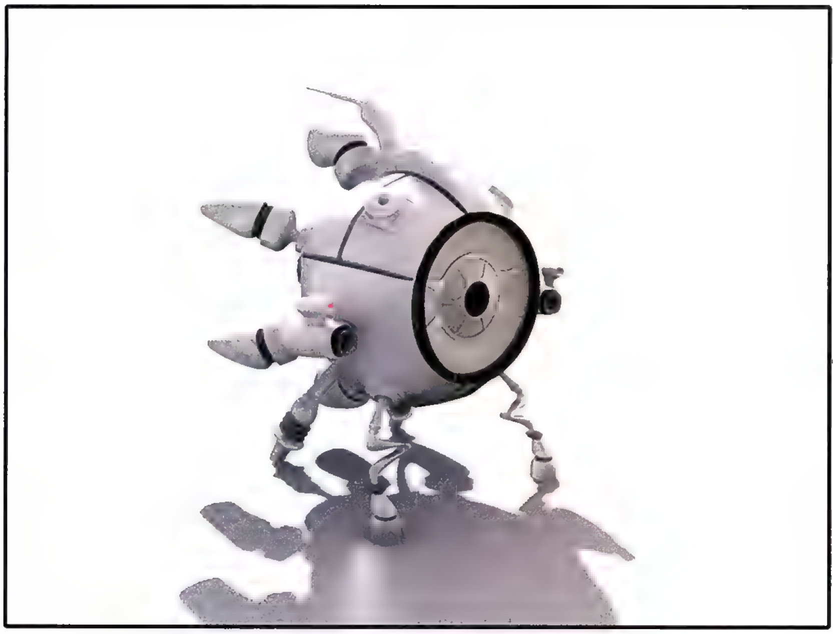
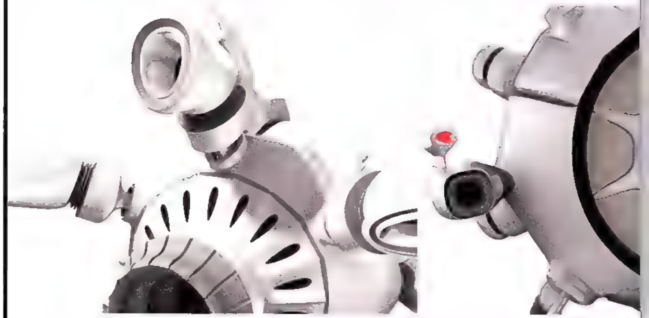
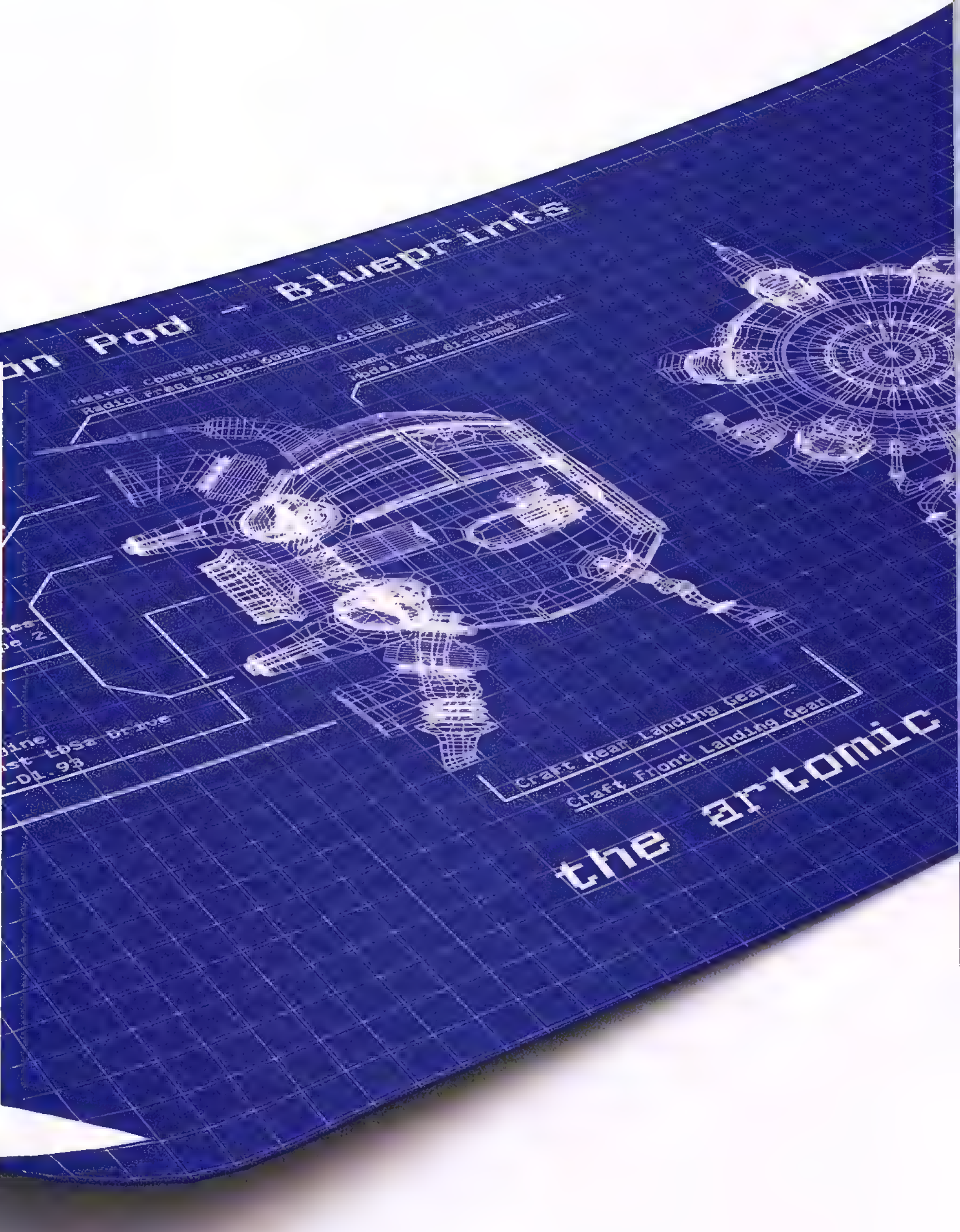




## artomic competition

'The Artomic Pod Project' by Nicholas Bedford



First, I made the Pod model in 3dsmax and then rendered that and a wireframe blueprint. I then made the texture for the blueprints in Photoshop and rendered the final blueprint part in 3dsmax.

**Create the winning *Art*omic and win the latest version of combustion, valued at $1995, from discreet. Email a preview (no larger than 5MB) of your games or hardware-themed masterpiece to:**

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# Reviews

## Renovation time

It seems John Gillooly has caught himself a nasty dose of the upgrades.

As children, geeks approach the world with wide eyes and lots of questions. How are babies born? Why do bad things happen to good people? When should I upgrade my system?

While the first two answers are easy – storks and God is a sadist; the last is much harder.

Picking a time to upgrade is nightmarish, even with some educated foresight. What with new frontside bus speeds, memory support, socket changes and the upwards spiralling of performance you can be assured that your beastly system of today will be usurped in short order. But then again, that is a struggle we have been dealing with for years now.

Well, if you've been putting off the inevitable, now is probably a good time for one of those 'demote your current system to the role of Linux gateway' upgrades. Intel's new i915 and i925X chipsets throw a lot of current technology out the window in pursuit of a rapid move to next generation tech.

Getting our 915 and 925 testbenches up and running has been an exercise in high level scrounging. Albatron kindly supplied us with a CPU and motherboard during Computex, then fired through a GeForce PCX 5750 a week later, Altech jumped in with some Corsair DDR2 and then some Antech EPS power supplies when we realised that the onboard power connectors had 24 pins; and thankfully some coolers already supplied by Thermaltake had the necessary mounting pins for LGA 775.

All of that effort just went into having enough hardware for one testbench. That isn't counting the fact that we already use Western Digital SATA drives for testing so we didn't need to upgrade those.

You can probably predict what happened when we put the first system together and applied power. We watched that orange light on the monitor as the system went through the usual aural clicking and spinning that accompanies boot, but nothing happened. It is the troubleshooter's nightmare. We had no idea what component was causing the lack of bootage being experienced, so we twiddled, twirled and got it going as far as a POST screen, but then nothing.

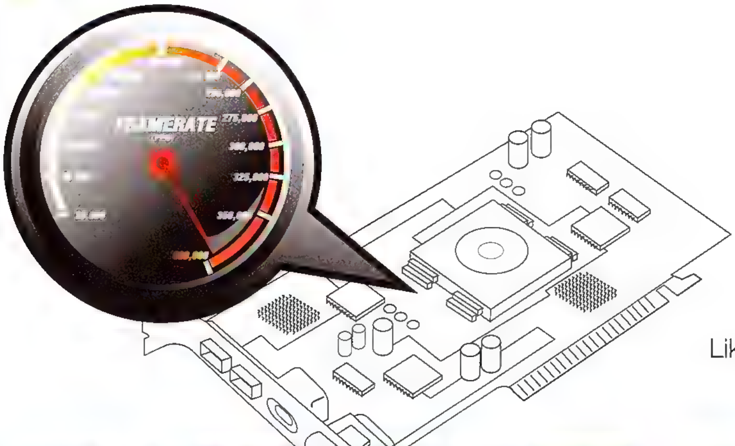
Then the 'official' Intel review kit came through and we managed to get everything running smoothly. Inside lay a 925X mobo, two sticks of DDR2, a couple of CPUs (but only one heatsink), and two Maxtor 16MB cache SATA drives. Tasty and all but it was lucky we had secured some PCI Express video cards that had just rolled off the production lines. And if it wasn't for some great work by Gigabyte to get an X800 XT PCI Express card into the country for a few days, we would have ended up testing this high-end setup with a decidedly mid-range GeForce PCX 5750 card.

It has been a while since things in the Labs have been that exciting, but the sheer confusion we experienced will reign in the retail market for a few months yet. From talking to manufacturers at Computex I was able to get a rough picture of release schedules for the PCI Express generation, and it is chaotic.

Initially Intel will be the only chipset maker with support, others will come through later on for the P4. While chipsets like nForce3 have been tweaked to support PCI Express, the Athlon 64 will have to wait a little while to have full support, and DDR2 does not even seem to be on AMD's cards for this year.

The first video cards to use x16 PCI-Express will come from the low end of the performance scale, with NVIDIA's GeForce FX-based PCX series and ATI's X300 and X600 cards coming first. In a month or two we will see retail variants of the high end X800 XT and GeForce 6800 cards, which need extra power connectors when overclocking, requiring two molex plugs to get the requisite juice.

It's a crazy amount of new bits and pieces to play with but by God, isn't that our childhood dream? Screw the marketing crap about facilitating the digital home, these chipsets are all about dreaming that hardware dream, and if things work out, snuggling up to some shiny componentry.



# Framerate

Like genetically enhanced chocolate cabbage, feisty framerates are highly nutritious.

'If the automobile had followed the same development cycle as the computer, a Rolls-Royce would today cost $100, get a million miles per gallon, and explode once a year, killing everyone inside.' – Robert X. Cringely

### Sapphire X800 PRO

Specifications: ATI RADEON X800 PRO; 256MB 256-bit GDDR3 RAM; 400MHz dual RAMDACs.
Core speed: 475MHz
Memory speed: 900MHz
Price: $699
Supplier: Achieva
www.achieva.com.au

The next-gen cards are now streets ahead, leaving older cards behind by a massive gap. Performing with no measurable difference to the other X800 PROs, it's probably a good thing the X800 has presented itself as another caning good core from ATI.

This card thwarts some royal mean man balls and pushes real-world gaming as far over the edge as it will possibly allow itself on our test bed. If the price is good for you, jump onboard.

**Sapphire**
www.sapphiretech.com

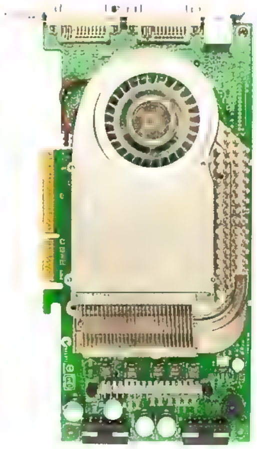
### Gigabyte X800 PRO

Specifications: ATI RADEON X800 PRO; 256MB 256-bit GDDR3 RAM; 400MHz dual RAMDACs.
Core speed: 475MHz
Memory speed: 900MHz
Price: $889
Supplier: Synnex
www.synnex.com.au

Perhaps the most noticable thing on this insanely fast card is the two flickering bright blue LEDs that sit in behind the fan. These trippy lights will help you achieve a Zen-like status when stared at for longer periods of time than would be considered 'sane'. The only real defining factor in grabbing one is the price, considering the Gigabyte X800 PROs are all manufactured by ATI and not exactly filled with seemingly forever-invalid Half-Life 2 'BS' vouchers.

**Gigabyte**
www.gigabyte.com.tw

### ASUS 6800 Ultra

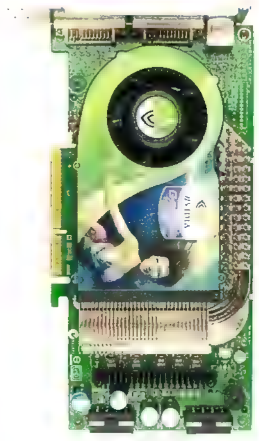


Specifications: NVIDIA GeForce 6800 Ultra; 256MB 256-bit GDDR3 RAM; 400MHz dual RAMDACs.
Core speed: 400MHz
Memory speed: 1100MHz
Price: $839
Supplier: Achieva
www.achieva.com.au

Not content with NVIDIA's slot-stealing, massively-designed video card coolers, ASUS has come out with a much leaner design. And it works reasonably well, leaving room to actually use that forbidden PCI slot. Nonetheless, you probably won't want to use the PCI slot directly under the card, as its temperature is an impediment even when idle. Making use of the two very much necessary power connections are eight or so trippy blue LEDs.

**ASUS**
www.asus.com.au

### Forsa 6800 Ultra

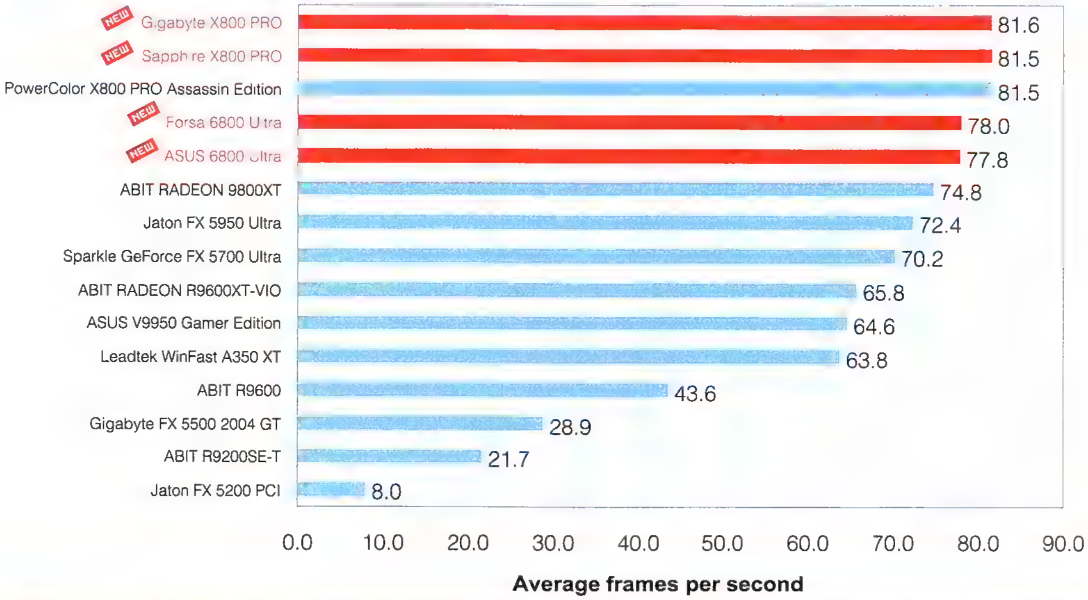


Specifications: NVIDIA GeForce 6800 Ultra; 256MB 256-bit GDDR3 RAM; 400MHz dual RAMDACs.
Core speed: 400MHz
Memory speed: 1100MHz
Price: TBA
Supplier: SATO
www.satotech.com.au

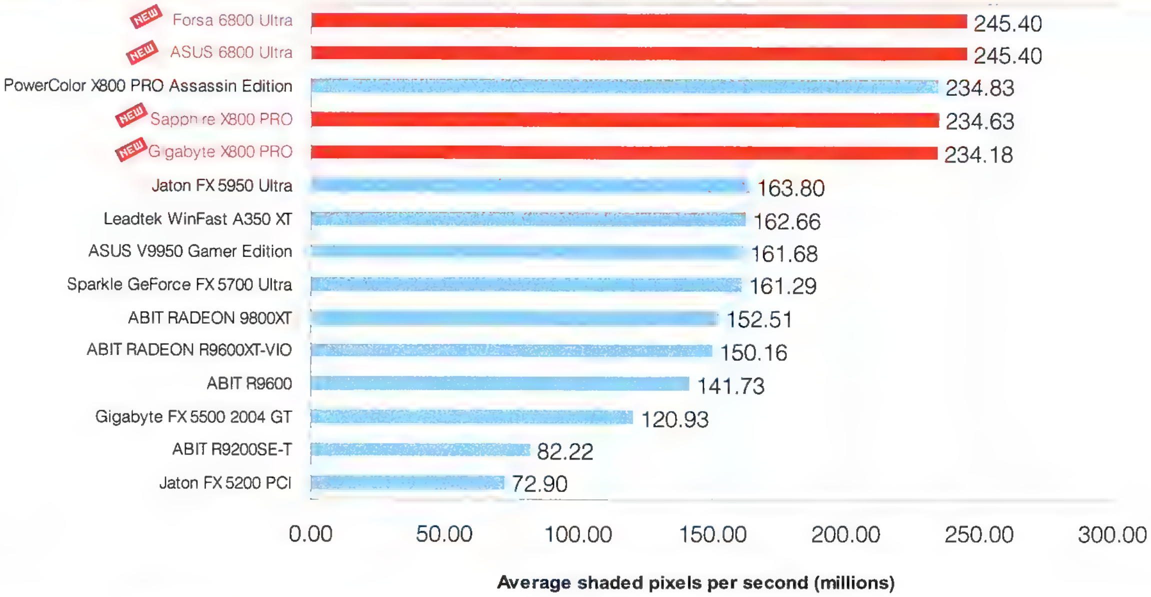
When compared with the RADEON 9800XT, this card gives it a solid kick in the pants. Which is what NVIDIA always wanted to do. The problem is ATI's new baby – the X800 XT – still takes the prize in terms of performance in today's games. But only just, and equipped with Shader Model 3.0, the 6800 is ahead in terms of theoretical performance; and this should show in future games. Until then, this one comes packaged with Duke Nukem: Manhattan Project.

**Forsa**
www.forsa.com.hk

## Call of Duty



## Aquamark 3



## Video cards

Thanks to the unveiling of PCI Express a lot has been changing in the graphics market. At the top end NVIDIA has its SLI capable PCI E GeForce 6800 Ultra and GeForce 6800 GT cards, then the 12-pipeline PCI E GeForce 6800. Below this sit three rebranded and PCI Expressed FX series cards, the GeForce PCX 5900, GeForce PCX 5750 and GeForce PCX 5300.

NVIDIA will launch a new range of cards later this year. These will use the 6800 architecture with fewer pipelines enabled and should deliver great performance for the price. NVIDIA is currently targeting the performance of the low end four-pipeline card at a similar level to the previous top of the range GeForce FX 5950.

ATI has announced PCI E versions of its RADEON X800 XT and X800 XT Platinum Edition cards, and they are unlikely to ship too many PCI E X800 PRO cards to market. Below these sit the new X600 mid range and X300 low range RADEON cards.

## CPUs

Changes are afoot, with Computex marking the launch of AMD's Socket 939 CPUs. Currently the motherboards that power these processors are based on older chipsets, but in the next quarter expect to see chipsets for the Athlon 64 that support new technologies like PCI Express.

AMD has also announced the 32-bit Sempron processor, which will replace the Duron and low end Athlon XP CPUs. Semprons should ship in August.

Also expect to see NVIDIA come up with a chipset that supports dual PCI Express graphics slots, as SLI is currently only avialable on Intel's E7525 platform for the Xeon.

On the other side of the CPU fence sit a few Intel launches, most importantly the new LGA 775 socket design. There are a range of P4 CPUs that have been launched in this form factor.

Intel has also launched it's Prescott based Celeron D CPUs. These use a 533MHz FSB and have 256KB L2 cache, a quarter of the Prescott's 1MB. But they should be great overclockers.

# Gigabyte GA-8GPNXP Duo

John Gillooly spans two generations of memory technology.

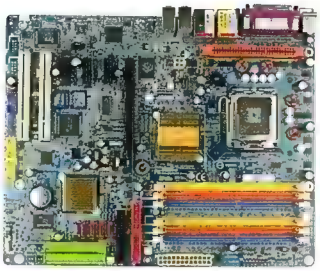
**Supplier:**
Synnex
*www.synnex.com.au*

**Website:**
Gigabyte
*www.gigabyte.com.tw*

**Phone:**
Synnex
1300 880 038

**Price:**
**$429**

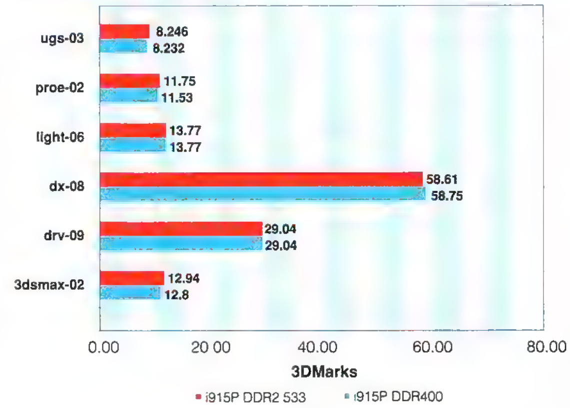
**Specifications:**
Intel 915P chipset; ICH6 southbridge; DDR400 or DDR2 533 memory support; four SATA and three parallel ATA ports; dual power system; USB 2.0, IEEE1394, 802.11b/g wireless; dual GbE.



**One of the most** fundamental joys of buying a product for upgrading is exploring the extra bells and whistles that are in the box, a joy that Gigabyte has taken to extreme levels with the GA-8GPNXP Duo motherboard. Inside the ludicrously sized box is nearly every accessory you will need, making this one of the most complete mobos we have ever seen in the *Atomic* labs.

Our PCI Express (PCI-E) testing this month has meant we've played with a lot of boards based on Intel's Express chipsets, but the GA-8GPNXP Duo stood out from the pack, not only due to its features but it's also the only board so far to enter the *Atomic* labs with support for either two sticks of DDR2 533 RAM or up to four sticks of DDR400.

SPECViewperf

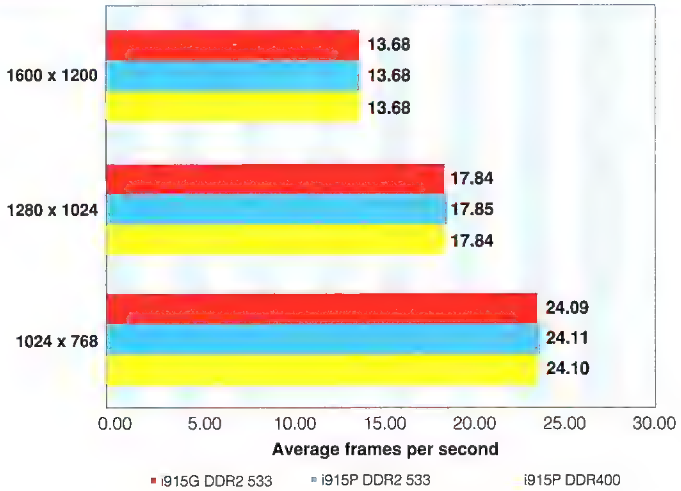


This is important because our testing has clearly shown that the latency difference between DDR and DDR2 memory means that there is no noticeable performance difference between DDR400 and DDR2 533 memory. By going for a board that supports dual standards, you can minimise the impact of upgrading costs by using your existing DDR memory.

But dual memory is not the only defining feature of this board. It marks the debut of a new dual power system board from Gigabyte, which now uses a small heatpipe cooler to keep it cool and quiet. This add-in board also has a row of LEDs that show how much power drain is occurring.

Besides these features, there is also dual Gigabit Ethernet, three x1 PCI-E and one x16 PCI-E slots. It also has two channels of parallel ATA RAID alongside the one parallel and four SATA ports incorporated within the ICH6 southbridge. It ships with a PCI-based 802.11b/g wireless card; but this does not use the new wireless Access Point hardware that Intel has built into the ICH6-RW version of its southbridge.

Aquamark 3



We tested the GA-8GPNXP Duo with both Corsair DDR2 533 and DDR400, using a Gigabyte GeForce PCX 5750 graphics card. Our testing for this month's Head 2 Head showed that there was no measurable difference between the performance of the i925X, i915P and i915G chipsets, so instead we have focused upon the performance difference between DDR400 and DDR2 533 on this board.

From looking at the graphs you can clearly see that there is no noticeable performance gap between the two memory technologies in either the gaming focused Aquamark 3 or the memory bandwidth sensitive SPECViewperf.

The complete lack of performance difference is great for those looking to upgrade, especially if you already have a DDR-based system. At the moment, DDR2 is a costly option and your money would be better spent on a PCI-E graphics card, as there is no AGP support whatsoever in the new chipsets (any boards that have AGP slots will be running them at reduced speed and hence low performance via the PCI bus).

While there is no tangible performance boost to be gained over the previous generation i865 chipset, those looking at upgrading to a Pentium 4 system are advised to look forward and go with one of these Express chipsets. Our testing has told us that the best option in terms of price/performance is the i915P, and it is the combination of this and an astonishing range of features that makes the Gigabyte GA-8GPNXP Duo the standout i915P board in the initial batch of products. There are so many bells and whistles on this board that we are still discovering new things everyday. Good work Gigabyte. JG

SCORE

**9/10**

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# Lite-On SOHW-832S

**Supplier:**
Synnex
*www.synnex.com.au*

**Website:**
Lite-On
*www.liteonit.com.tw*

**Phone:**
1300 880 038

**Price:**
**$549**

**Specifications:**
2.4x DVD+R9; 8x DVD-R/+R; 4x -RW/+RW; 12x DVD-ROM; 40x/24x/40x CD-RW; 2MB cache.

**Finally, dual layer DVD** burners are accessible outside the price point of financing your own DVD pressing plant – that would, mind you, rock ridiculously hard. Dual layer DVD burners are about to fire into the market, even though at the time of writing, burnable dual layer media is stupidly scarce. To put it in perspective, one of major media manufacturers had a grand total of 10 burnable discs available in this country.

Currently there's a catch to dual layer DVDs and it screams double standards. For the moment, at least, this standard exists only for +R, known as DVD+R 9, as the DVD Forum hasn't yet got off its arse to standardise DVD 9 compatible DVD-R dual layer media. Chances are high it'll develop one, seeing as it won't want to stand around twiddling its thumbs whilst its nemeses support a meatier media type.

This drive comes kitted with a decapitated version of Nero, aka Nero Express 6.0, but that's a moot point when it's the drive's performance that matters.

Strapping it to our testbench, we fired it up, popped in a 2.4x DVD+R 9 disc and gave it a good once-over with Nero's CD/DVD Speed. As this drive is a first-generation DVD+R 9 burner, it's only capable of burning at 2.4x speed (3240KB/s) on dual layer DVD+Rs. The total test burn ticked away at an average of 2.36x. As close as that is to the written speed, it's insanely slow for burning 8.4GB (ahem, make that a realistic 7.96GB) of data.

So is it worth this high price tag? Well, if you have the money to spare and you already have plans to immediately use the extra storage space, steam ahead and grab one. With a max feed speed 8x for DVD-R/+R – just over a lazy 11MB/s – you won't be left waiting, unlike with its DVD+R 9 45-minute waiting time. We don't think it will take too long for the cost of these drives to fall to a reasonable price point.

Not overly spectacular, but if you feel your life depends on the use of 8GB on a DVD disc *right now*, you won't be disappointed with this drive. Otherwise, with only a DVD+R variant of dual layer, and with higher speeds arriving soon, it may be best to wait for it to mature – along with the predictable price dip. ND

SCORE 8/10

# Soltek Qbic EQ3801 MW

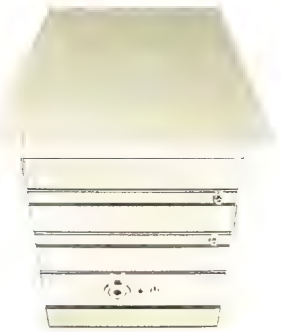
**Supplier:**
Altech
*www.altech.com.au*

**Website:**
Soltek
*www.soltek.com.tw*

**Phone:**
Altech
(02) 9735 5655

**Price:**
**$537**

**Specifications:**
NVIDIA nForce3 250 GbE chipset; two 5.25in and two 3.25in drive bays; two SATA and two parallel ATA connectors; 250W PSU; custom HSF; mirrored front panel.



**Even newcomers to the** small form factor market are now into the second or third generation of products, and this is beginning to show in the build quality and functionality of these barebones' chassis. We looked at Soltek's Qbic SFF PC late last year, and found some deficiencies in design that held it back.

Coming with an Apple-esque white enamel shell and swanky mirrored front, the new generation Soltek EQ3801 MW has an impressive spec list. Based around NVIDIA's nForce3 250GbE chipset, it supports socket 754 Athlon 64 CPUs and comes with NVIDIA's Firewall technology, 250 watt PSU, Gigabit Ethernet, IEEE1394, two SATA channels and eight-channel AC'97 audio.

Like the previous generation, the chassis supports two 5.25in optical drives, with drive covers built into the mirrored front panel. It also has one external and one internal 3.25in drive bay, with a spring-loaded cover over the external one. Unlike the previous generation, whose construction we found somewhat flimsy, the EQ3801 MW is much more structurally rigid.

For cooling, the EQ3801 MW relies on a small fan to suck the air out of a slot at the rear, combined with small grilles on the side panels. It is not as elegant as some cooling solutions, but it works OK under normal conditions (although we were unable to replicate hot summer conditions during testing). There is no integrated video, however, so an AGP card needs installing, which can block one of the side vents quite effectively.

Besides this, it is a decent case to work in, although other manufacturers have much more user friendly products about to hit the market. But Soltek has gone to the effort of tidying up the often terrifying cable tangle inside the box, which makes life much easier when installing hardware.

With the Qbic EQ3801 MW, Soltek has leveraged the nForce3 250 GbE chipset quite well to provide a host of functionality.

This is a competent offering, even if it lacks a lot of the trickery that will appear from other manufacturers over the next month or two. Good, but still a few steps from great. JG

SCORE 8/10

# Gigabyte RADEON X800 XT Platinum Edition Express

John Gillooly chomps down on some ATI flavoured PCI-E graphics.

**Supplier:**
Gigabyte
*www.gigabyte.com.tw*

**Website:**
Gigabyte
*www.gigabyte.com.tw*

**Phone:**
N/A

**Price:**
**TBA**

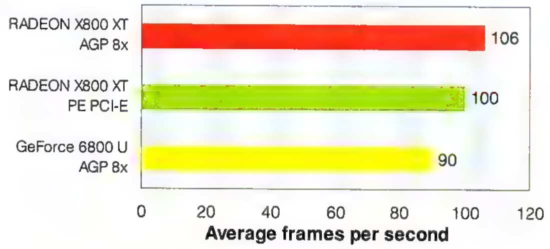
**Specifications:**
RADEON X800 XT PE; x16 PCI Express; 16 shader pipelines; six-pin power connector (needed only for overclocking); 256MB GDDR3 memory.

**In the AGP space** there is no graphics card that can touch the raw performance delivered by ATI's RADEON X800 XT card. This multi-pipelined monster has demonstrated in numerous tests that it eats even the high performance GeForce 6800 for breakfast.

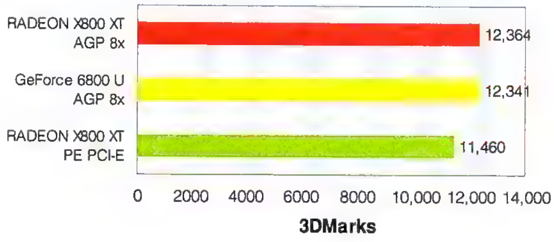
While in development the X800 XT went by the codename R420, and snuggled next to another core called R423 on ATI roadmaps. R423 is essentially the same graphics core apart from one significant difference, it replaces the necessary AGP circuitry with native PCI Express (PCI-E) transistors. NVIDIA, on the other hand, has gone with a discrete PCI Express bridging chip to make its existing AGP native chips interact with a PCI-E motherboard.

At the moment we don't expect there to be any real performance difference between the two solutions, apart from some HDTV editing markets that will make use of the bi-directional communication built into PCI-E.

Far Cry - 1600 x 1200



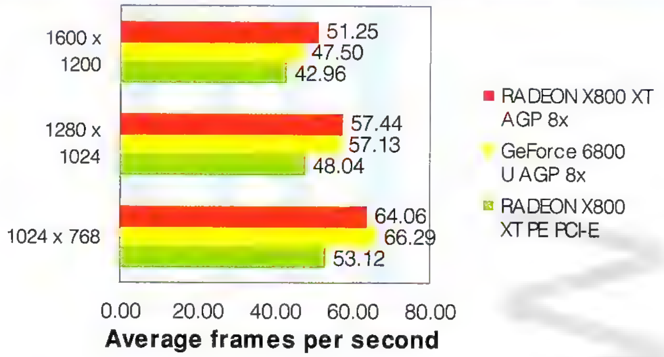
3DMark03



R423 has now been unveiled in the guise of the RADEON X800 XT PCI-E. There is no significant change in the specs or technology in this core above and beyond the inclusion of PCI Express.

With the X800 XT PCI-E ready to hit retail soon, we were keen to see how it matches up against its AGP brethren. Thankfully Gigabyte was able to supply us with a sample of its RADEON X800 XT Platinum Edition PCI-E card to test out on our newly assembled PCI Express test rigs. The term Platinum Edition denotes that it runs at higher core and memory speeds than normal X800 XT cards.

Aquamark 3



We tested the card on an ABIT AA8 motherboard, which uses the i925X chipset, paired with 1GB of dual channel DDR2 533 memory and an LGA 775 3.4GHz EE P4 CPU. The results have been compared to our ASUS P4P800-E Deluxe (i865G based) testbench, with 512MB of dual channel DDR400 and a 478-pin 3.4GHz EE P4 processor. The AGP X800 XT card was connected to a single Molex power connector, while the PCI-E version used no external power (the six-pin power connector on the card is mainly used to help with supplying more juice for overclocking). We also compared the results to a GeForce 6800 Ultra running on the i865G based testbench.

Because all the hardware used in the i925X based system is engineering or early production sample, we can only preview this to show how things are shaping up in the high end of the graphics card market.

When looking at the results, the word that springs to mind is immaturity. In all the tests the PCI-E system falls behind by a small but noticeable margin.

In the case of 3DMark03 the score is almost 1000 marks behind both the AGP X800 XT and the 6800 Ultra, delivering a score that is still breathtaking but not jawdroppingly so.

But 3DMark03 is the one test in which the 6800 Ultra really sticks it to the X800. In Far Cry we see that while the AGP X800 XT comes out in front, the PCI-E card is noticeably quicker than the 6800.

Finally, looking at the Aquamark3 graphs show both AGP cards winning out again and the PCI-E card coming in an, admittedly speedy, third place.

Gigabyte's RADEON X800 XT Platinum Edition is certainly a beastly piece of silicon, with respectable performance indeed. However, be it through the immaturity of drivers or the i925X chipset, or indeed latency issues inherent in DDR2, it is not yet translating this into raw frames.

We will revisit the card once retail products hit the market and take a second look, for now all we can really say for sure is that X800 XT AGP owners will not want to bother upgrading to PCI Express for the next generation or two of graphics hardware. JG

Leonard Nimoy performed the voice for Galvatron in the original *Transformers* movie back in 1986.

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**ICQ:** 27736587
**Email:** sales@scorptec.com.au

**Open;** Mon-Fri: 10am - 6pm
Saturday: 10am - 3pm
Sunday: Closed

# Adaptec 2410SA + RAID enclosure kit

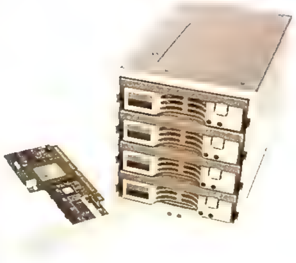
**Supplier:**
Harris Technology
*www.harristechnology.com*

**Website:**
Adaptec
*www.adaptec.com*

**Phone:**
Harris Technology
1300 139 999

**Price:**
**$945**

**Specifications:**
Adaptec 2410SA SATA RAID controller with onbord 64MB cache; Adaptec four port fan-cooled RAID enclosure; remote and local RAID management software for Windows and Linux.



**With the recent move** to integrate RAID functionality into onboard controllers, as revealed in the latest chipsets from NVIDIA and Intel, a standalone RAID capable SATA controller isn't anything special. But the four bay hot-swappable RAID chasis that comes with this one certainly is.

Aside from the four-port Adaptec 2410SA – Adaptec's flagship SATA based RAID controller – this kit comes with a specialised enclosure designed for the RAID at heart: four hot swappable clip-in drive carriers that slide into an internal chasis complete with 90mm fan for cooling paired with inbuilt temperature and fan failover alerts. Two Molex plugs are required to power the chasis which also comes with a specialised connector to hook up the drive LEDs to the 2410SA card – if you've ever wanted to see the individual drive accesses of your four drive RAID 0 array, now you can!

The chasis is designed to replace 5.25in drive bay housings in tower cases, and comes in both beige and black for the style concious. Installation is simple, and SATA ports at the back are clearly marked so you can hook up the right drive to the right port.

The controller itself has an excellent BIOS setup tool for creating and managing RAID arrays, which includes levels 0, 1, 5, 10 and volume spanning (JBOD). Windows management software is also provided, as is the ability to manage an array over the network. The card is also supported in Linux, with a bootable Linux CD supplied to allow management of an array should the system's OS go walkabout.

We tested the kit with two 7200rpm Maxtor Maxline III 250GB SATA drives on an nForce3 250 Athlon 64 system to see how the card performed. As expected, the two-drive RAID 0 array proffered a respectable performance increase, undoubtedly helped by the 2410SA's onboard 64MB cache. In SiSoft Sandra 2004 the array scored a clean 78MB/s, compared to 47MB/s for a single drive, while in ATTO 2.1 it scored 72MB/s write with an impressive 97MB/s read.

Overall this is a speedy solution for creation and management of RAID magic, but it comes at a cost. For the price you can just as easily buy four SATA drives, connect them to your onboard contoller, and use software RAID for the same result. It wouldn't be as *cool*, of course, but it'd do the job just fine. AM

SCORE **8/10**

# Compro VideoMate Live USB2.0

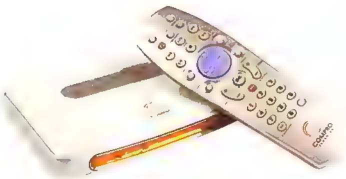
**Supplier:**
Ocean Office Automation
*www.octek.com.au*

**Website:**
Compro
*www.comprousa.com*

**Phone:**
Ocean Office Automation
(02) 9748 6788

**Price:**
**$329**

**Specifications:**
Analog TV-tuner; S-Video-in; hardware MPEG2 decoding; USB2.0 interface; requires external power.



**With everyone crowing about** moving the PC closer to the television, logic dictates that TV tuners are an evolutionary dead end. I mean, why fork out cash for a tuner that plugs into a PC that is hooked up to a TV? The answer is actually pretty compelling, namely, TV tuners allow us to record direct to our hard disks thanks to associated Personal Video Recorder (PVR) software packages.

Compros VideoMate Live USB2.0 is a nicely featured little product, using USB 2.0 and a hardware MPEG2 encoder to make PVR functions a reality and adding to that, video-in. All of this is then packed into a sleek little external box with IR remote control. Unfortunately it does require external power, sucking down more juice than that which would be supplied over the USB link.

A big part of a TV tuner is the quality of the software that runs it, and ensuring that you have the latest drivers and patches is a must. We grabbed these from Compro's website and had little trouble getting the box up and running, and only a short while later we were recording live TV. We did have trouble getting the timeshifting functions working, but everything else went smoothly.

Besides TV, the box also has an S-Video and headphone jack audio line in, allowing you to record from another source, while still displaying on the television. It is a handy function, especially for those who lack a VIVO graphics card.

Overall image quality is good, but not outstanding. There are a variety of MPEG2 settings that you can use for recording, but it is a shame that the more storage capacity friendly MPEG4 format is not supported. We did experience occasional instability when shutting down the software, but generally it worked well when controlled by either the mouse or remote control.

While the Compro VideoMate Live does well, it isn't outstanding. The combination of TV tuner, MPEG2 encoding and video input is damn handy. However, there are now TV tuners on the market at a similar price point that do similar things using the superior digital television signals (which makes for a much sexier quality of recordings) that are being broadcast side by side with analog in Australian capital cities. JG

SCORE **7.5/10**

'Always and never are two words you should always remember never to use.' – Wendell Johnson

# DFI K8M800-MLV

Relieved, Nathan Davis finds it isn't the size of the package, it's how it's used.

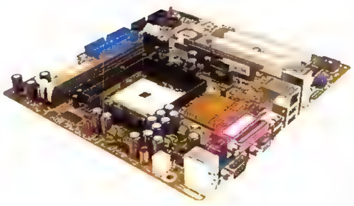
**Supplier:**
MTD
*www.mtd.net.au*

**Website:**
DFI
*www.dfi.com.tw*

**Phone:**
DFI
1300 369 985

**Price:**
**$160**

**Specifications:**
VIA K8M800 northbridge; VIA VT8237 southbridge; S3 UniChrome2 onboard graphics; SATA RAID; USB 2.0; AGP 8x; six-channel AC'97 audio; onboard 10/100Mb/s Ethernet.



**Brandishing the new VIA** K8M800 northbridge chipset, this is one of the first Athlon 64 motherboards outfitted with onboard video to hit the market. And this incredibly tiny Micro ATX board measures a mere 24.5cm x 23cm.

By default, this motherboard is completely silent, with simply a small heatsink clipped to the northbridge. That's as far as cooling goes and this is all it really needs. Even though the graphics controller is under the same heatsink, it barely jumps above lukewarm, even under full use. You'll see why.

It's definitely well equipped, considering the board's size, with two SATA RAID-capable ports, two PATA ATA133 channels, support for DDR400 memory (two DIMM slots), a FireWire header, four USB 2.0 ports, six-channel audio (although it's only an AC'97 chip) and a 10/100Mb/s Ethernet port. Nothing overly jaw dropping, but these are considerable features for a board of this magnitude. It's freaking tiny.

VIA SATA controllers can generally be a royal pain in the arse, so we were happy not to come across any major irritating problems. However, being a VIA SATA controller, drivers are required even if you're simply using the controller as BASE and not RAID.

The onboard VIA S3 UniChrome2 IGP is really the one and only difference between a VIA K8T800 and a VIA K8M800 chipset. This new graphics controller sports dual pixel pipelines, running at a 200MHz core speed and supporting up to 64MB of system memory.

Since ATI unleashed its powerful RS300 – RADEON 9100 IGP – chip onto the market, our expectations have risen dramatically as to the performance we expect from onboard video. The UniChrome2 controller has some serious competition and unfortunately it fails dismally for anything other than standard 2D tasks.

We found the onboard graphics to be seriously lacking both power and functionality. The blighter wouldn't even consider loading Call of Duty and would only run the first game test in 3DMark2003, delivering a feeble score of 110 3DMarks. The Codecreatures benchmark also wouldn't load.

Check out the results and you can see the GeForce FX 5200 beat the jocks off it. Seeing as VIA pimps the controller as a '2D/3D engine', this level of functionality is not impressive. Luckily, it has an AGP 8x slot.

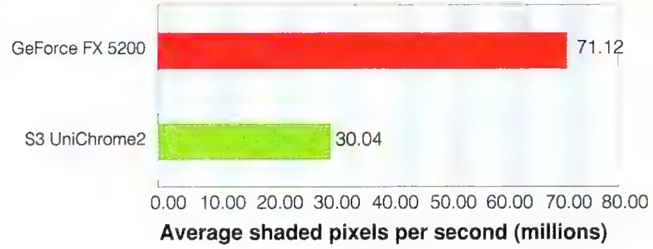
The lack of any decent pixel shader support – and even proper hardware support for DirectX 8.0 – was the sole source of our problems. If you're after some decent onboard 3D graphics, the leader in this is still ATI with its mighty RS300. Its pixel shader supports up to version 1.4 and fully supports DirectX 8.1.

However, aside from the lacklustre graphics, we found its performance in comparison to a full-sized K8T800 mobo relatively good. We strapped the mobos onto an Athlon 64 3200+ and 512MB of DDR400 memory, sharing 64MB of this out to the K8M800-MLV's onboard video.

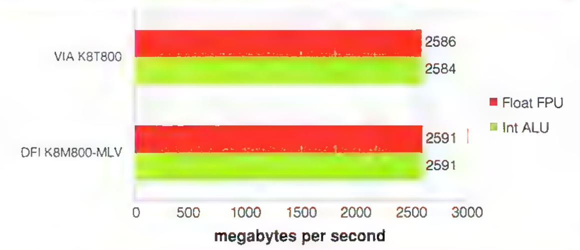
The results speak for themselves; the board even managed to creep ahead slightly in SiSoft's memory test. In PCMark04, it dropped off a tad, but the majority of this was due to the video card tests, in which the FX 5200 had a significant speed advantage.

Looking at the bigger picture, sure, the onboard video was startlingly nasty, but the mobo's performance made up for this. It performs about the same as that of a significantly larger motherboard, albeit now edging around the similar price point. Whack in a decent AGP video card and sound card, and this baby would make a top miniature platform for gaming. ND

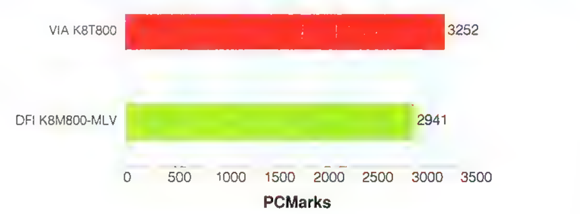
Aquamark 3



SiSoft Sandra memory bandwidth



PCMark04



SCORE 8/10

'I have often depended on the blindness of strangers.' – Adrienne E. Gusoff

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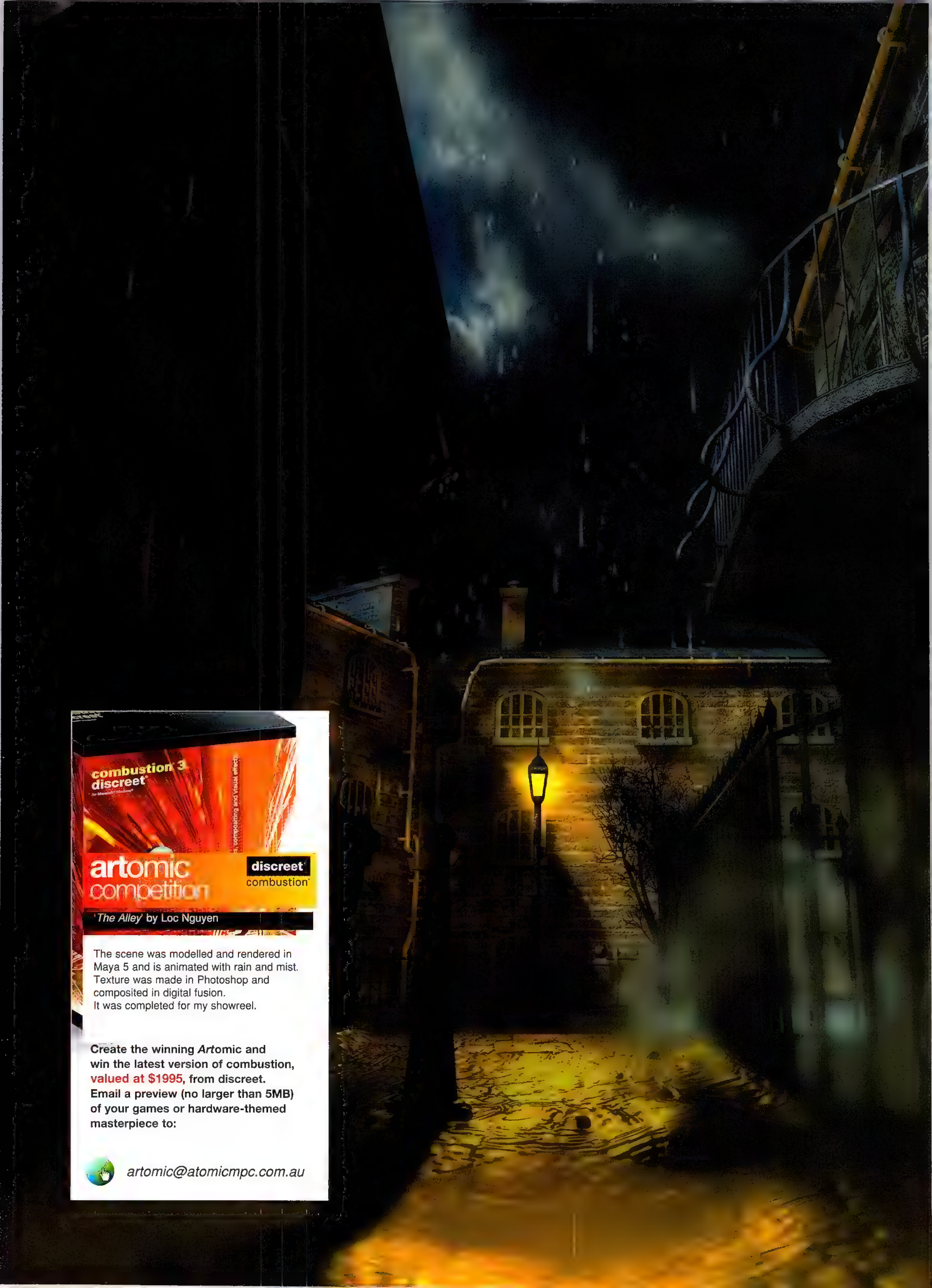


## artomic competition

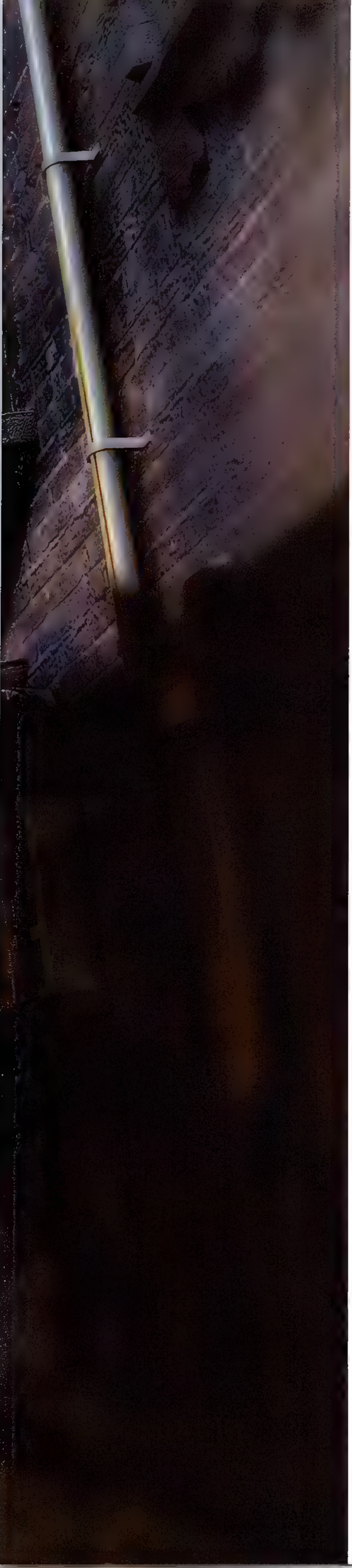
**discreet** combustion

'*The Alley*' by Loc Nguyen

The scene was modelled and rendered in Maya 5 and is animated with rain and mist. Texture was made in Photoshop and composited in digital fusion.
It was completed for my showreel.

**Create the winning *Art*omic and win the latest version of combustion, valued at $1995, from discreet. Email a preview (no larger than 5MB) of your games or hardware-themed masterpiece to:**

*artomic@atomicmpc.com.au*



# Games

## Final flight of the Titus

Logan Booker looks fondly back over the days of Interplay as it falls, flaming, from the skies of gaming.

On 4 June 2004, Interplay – the once-groundbreaking developer of Fallout and Baldur's Gate – had the doors to its offices in Irvine, California closed by state officials after it had neglected to pay its employees, or rent on its premises, for several months.

This news made the hearts of many cry, including ours.

But, a mere four days later, Interplay's CEO, Herve Caen, informed the world that the company had 'reopened its doors' having organised a way to remunerate its understandably estranged employees. Casting a minor but noticeable blemish on this chirpy turnaround was news that Titus Interactive, Interplay's majority shareholder, was going belly-up. Insert ambivalent emoticon.

While Titus has had a few noteworthy games like Robocop and, err, Titus the Fox, it's not down in the history books as a leading publisher of innovative titles. In fact, the only reason it gets a mention at all is, well, it's the majority shareholder of Interplay.

None of this is at all surprising; Interplay had been on a downward spiral ever since Titus took control halfway through 2001. Back then Interplay had its fingers in a variety of honey pots, including what was to become Enter the Matrix and Neverwinter Nights. The company also had quite an arsenal of up-and-coming games – Galleon, Hunter: The Reckoning and expansions for both Baldur's Gate II and Icewind Dale. Looking at this rather full plate of increasingly tasty morsels makes one wonder how it all ended up in Interplay's lap.

Admittedly, a month or two before Titus decided to force its feisty interests into the then clean and quivering Interplay, the company laid off 60 employees. Various sites originally reported this as an 'unknown percentage' of the company's workforce; now, looking at the latest reports of Interplay being 79 employees strong, we can deduce that it cut 43 percent – almost half – of its employees on that fateful day. Ah geez.

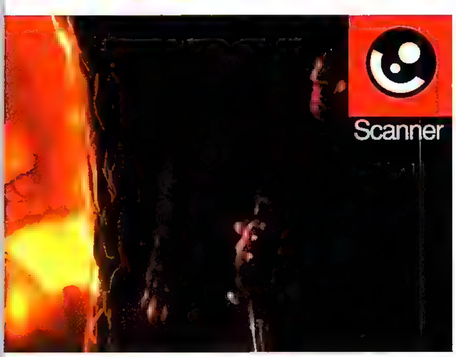
Things weren't looking too bad after the acquisition; Interplay and Vivendi had entered into a distribution agreement that promised to save the company US$10 million, and it had all those funky games coming to fruition. That was until September 2001, when BioWare decided to aim its legal cannons at Interplay for breach of contract – apparently Interplay had been 'sub-distributing' games without the permission of the developer. Although this dispute was eventually settled, it had serious repercussions on the freshly restructured Interplay. Then BioWare pulled out of its publishing agreement with Interplay for Neverwinter Nights, missing out on what became one of the most successful CRPG franchises ever. Ouch.

While culling 60 people is a kick in the teeth for any company, losing your founding CEO is the equivalent of a Dragon Uppercut in the range of crippling industry special moves. This is what happened to Interplay in the first month of 2002, when Brian Fargo, one of the brainiacs behind Fallout, left his position of chief executive officer. Why did he leave? 'Tension' with Titus.

A few months into 2002, Interplay put Shiny up for sale. Shiny had a long, successful history that included MDK, Messiah and, of course, the ultimately classy Earthworm Jim. What made Shiny particularly satiny to a buyer was the Matrix game it had boiling in the cauldron. As we now know, Enter the Matrix sold in excess of one million copies in its first week on shelves, despite the fact it was an abysmal game. It made money, yeah. But not for Interplay.

It got worse. Galleon averaged around 70 percent in the review stakes, while Hunter did slightly better, but not much. In January 2003, Titus was looking to sell Interplay itself, but nothing ever eventuated. The final death rattle came with the announcement that Black Isle Studios was closing down, and Fallout 3, which had been in development all along, would not see the light of day. People shed real tears over this. Big, watery tears.

The story ends with a few confused reports of Interplay being deep in debt; reports that were confirmed on 4 June. Right now, there are rumours that Fallout 3 may get a second wind, and Interplay could morph from a money hole to a money indentation. But, for now, it's all talk.



## ShortCircuits

Next year the Revolution will not only be televised, it will connect to a normal PC monitor. Nintendo chief, Satoru Iwata, recently let slip that Revolution is the codename for its next-gen product. With Nintendo's philosophy of creating innovative gaming devices (and making useless product release pre-announcements), it may or may not be a GameCube successor. But it will be shown at E3.

Owners of games using a copy protection used by Codemasters and others, called StarForce, are kicking up a stink over the fact that the copy protection installs several hidden drivers to Windows. Uninstalling the game is not enough to remove the StarForce drivers, which have reportedly caused conflicts on some systems. Another problem is that the drivers need updates whenever a Service Pack is released.

Researchers from Barnes-Jewish Hospital in the US, have done a pilot study on people's ability to control computers with their minds. The study had a video game in which four people used the signals coming from electrodes strapped to their brains to play. Sure, to play the game only meant thinking of the word 'move', but it should only be a few years until it evolves to more familiar concepts like 'bunny hop, circle strafe, fire rocket, accuse other guy of being cheating newbie camping scum'.

**BUZZWORDIKAN**

### Depth Adaptive Tesselation

A technique for smoothly transiting the geometric complexity with distance. It does this to enable smoother displacement mapping by reducing the number of vertices in objects far from the camera and then mipmapping and filtering to ensure that the shift in geometry is clean.

● 'Nobody realises that some people expend tremendous energy merely to be normal.' – Albert Camus

**BREAKING NEWS!**

# Twice as spangly

NVIDIA thinks two graphics cards are better than one, John Gillooly tends to agree.

It is but three simple letters, SLI, but it is one of the most nostalgic terms for gamers worldwide. Scan Line Interleave technology was developed by Quantum3D for high end visualisation workstations and released to the public by 3dfx back at the end of 1997. It enabled end users to run two PCI Voodoo 2 cards together, getting a performance boost by assigning the alternate scanlines in an image to each card. It wasn't perfect, thanks to analog signal mixing that made for banding problems due to minor differences between cards, but it still stands as a sentimental high point in the evolution of desktop 3D graphics.

So it isn't surprising that NVIDIA has adopted the SLI acronym for its recently announced dual video card solution. In this case it stands for Scaleable Link Interface, but the end product is similar, a performance boost thanks to the ability to run two of NVIDIA's high end PCI Express GeForce 6800 Ultra or 6800 GT cards at the same time.

It is a technology that NVIDIA has built into its chips for the past four years, in order to enable their use in high end simulators and similar niche markets, but now it is being brought to the desktop. There are some specific hardware requirements to get it up and running, it will need a motherboard with dual x16 PCI Express graphics slots, and no one has announced such a product yet. It will also require some serious power to be supplied to it, but in return SLI promises a performance boost just shy of double that of a single card.

SLI's existence is very much the product of PCI Express (PCI-E) and DVI. It simply could not be done with AGP, which was a specialised solution for graphics cards. Because PCI-E is a scaleable interface, manufacturers can easily add another x16 PCI-E slot, which can be used as a x1 PCI-E slot when not occupied by a graphics card.

There is a small connector installed between the cards, however the majority of work is done thanks to the bidirectional nature of PCI Express communication. Also, because the signal is mixed digitally it avoids all the problems of 3dfx's SLI. All of this is enabled through symmetric multi-rendering and dynamic load balancing algorithms in NVIDIA's ForceWare driver suite. These algorithms split the scene up into the best configuration for speedy rendering and this means that the actual breakup of the rendering load will depend on the game title being run. It also means that there will be no need for game developers to specifically code for SLI. This is all scheduled to be enabled in NVIDIA's next official driver drop.

Benchmark results from 3DMark03 and Unreal Engine 3 are currently delivering a performance boost of 1.87x that of a single card, but while increased performance will be experienced in some titles, there may be circumstances where the boost is not as great. The nature of SLI means that for situations like render to texture, the entire calculation will have to be done on both cards to ensure that the image is seamless.

While NVIDIA does say it would be theoretically possible to pair any cards based upon the NV40 architecture together, in practice it will only be enabled on its 16 pipeline cards. It also recommends that the two cards come from the same manufacturer to ensure compatibility, but there is nothing in the theoretical side of the equation to prevent people from using two different brands of card.

For now NVIDIA is targeting the technology at what it calls the 'ultra enthusiast', but over the next year it should fall into the realms of affordability for mere mortals. If users find that the 6800 is slow in some future titles, they can just add a second card for an instant speed boost in the order of 80-90 percent. As NVIDIA's chief scientist, Dr David Kirk, puts it 'SLI makes the GeForce 6800 future proof'.

**Developer Quote of the Month**

'...this E3 was a lot like the last one: lots of sequels, lots of licences, low on innovation, high on noise.'

**International Game Developer Association program director Jason Della Rocca in his E3 2004 blog.**

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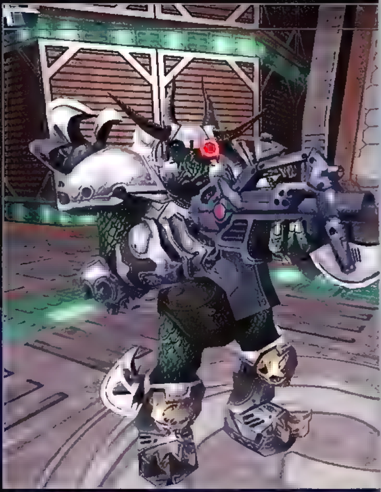
# Talk the Torque

An entire gaming engine for US$100? No wonder Torque is the talk of the town. James Wang shows you the goods.

How do you keep costs constant for a technology that is increasing at an exponential rate? Such is the grave problem facing the games industry today, where Moore's Law, the greatest blessing of the hardware industry, is becoming a curse for the software one. Because hardware growth has to translate to software growth in order to obtain any tangible benefit, the cost of harbouring this technology ultimately falls on the shoulders of software developers, artists and the like.

Unlike any of the engines we've reviewed in Engine Room, the Torque engine isn't about achieving certain graphical feats. Instead, it delivers an entire game engine for a licence fee of US$100. Taking a moment to consider what this includes – a massive code base, graphics engine, sound engine, highly efficient netcode, physics, AI – and factor in the cost of other engines (a quarter of million for Quake 3) and it's obvious that the whole package is undoubtedly a steal.



**ABOVE:** The new Torque Shader Engine (TSE) supports a range of advanced features.

## From Tribes to Torque

The origins of Torque can be traced back to the engine used in the first Tribes. Offering virtually unlimited terrain and addictive team play, Tribes earned an infamous cult following. Tribes 2 gave the engine an upgrade that later became known as the V12 engine. From this point, the founders decided to take a divergent path – instead of continuing the cutthroat graphics engine race, they decided to create GarageGames, a studio designed to aid the creation of independent games. They took the Torque engine (as it was later to known) and made it available for a licence fee of US$100. Soon many game enthusiasts from all corners of the industry began experimenting with the engine and for a while, GarageGames received positive feedback.

While it's only about three years since GarageGames was founded and the Tribes 2 engine was respectable, much has changed. The proliferation of shaders has meant a rebalancing of programmers and artists in game production. Torque, still using largely DX7 technology, has been looking less attractive by the year.

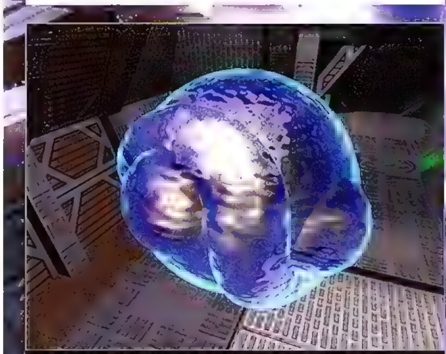
There were many reasons why shader capability wasn't added to Torque earlier. The less than total penetration of programmable GPUs was a main one. Today, DX8 class graphics cards ship on even the cheapest PCs with an existing user base that is huge.

DX9 class GPUs are standard on even modest PCs – it clearly makes sense to take advantage of shaders now.

## A long needed facelift

This year will see Torque's biggest upgrade since its release. The Torque Shader Engine (TSE) aims to bring Torque up to date with the recent advances in shader technology. In its first release, it will support a range of new features including glow and refraction buffers, a procedural shader system, detail maps, cube maps and specular lighting. Although it's a fairly modest set of features, it's a good start for an engine which has been left behind for two generations. In the future, the team plans to add full OpenGL support along with sophisticated shadows and water effects.

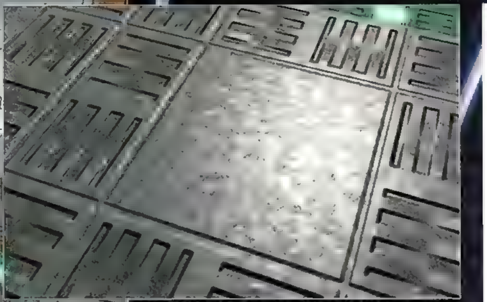
The real advantage of using Torque, however, is that it sits in a layer above the common graphics APIs. Ben Garney, the code guru behind Torque explains: 'Our graphics layer, referred to internally as GFX, is a complete abstraction, wrapping DirectX, OpenGL, or the API of your choice. It provides a DX9-ish interface. Once your code works with GFX, though, it will run on any platform or renderer that TSE supports.'



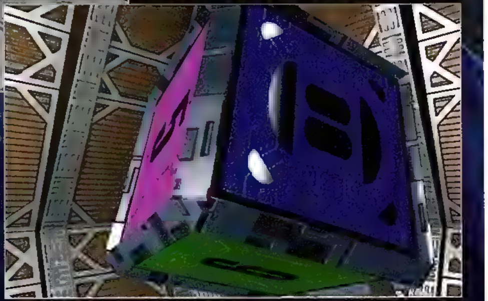
**ABOVE:** Vertex shaders are an important part of any advanced engine, and TSE is no different.

Other than Windows, currently Torque supports Linux and OSX. This ease of portability will be a strong selling point to independent developers.

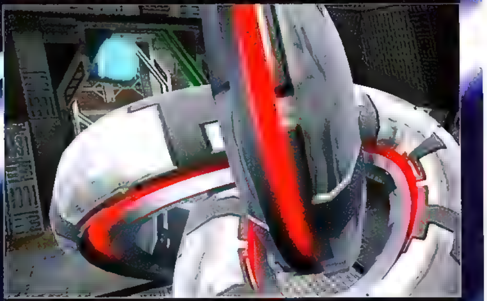
Notably missing from the rich set of tools and plug-ins that comes with Torque is a tool for normal mapping. Normal mapping produces wonderful results but requires a lot of work from the artists to get right. Garney cites several reasons why tools for normal mapping weren't included. 'There are several normal map generation tools available – ATI and NVIDIA have their own flavours, and there are also plug-ins for Max and Maya.' Garney also believes in concentrating on Torque's core strength, namely engine development rather than tool creation.



**ABOVE:** Specular highlighting and bump mapping at its best



**ABOVE:** TSE has no problems creating base materials and manipulating textures.



**ABOVE:** A complex model involving lighting, shading and movement.

## A new shader engine

Writing a good shader engine from scratch is an expensive process and this is where TSE comes in. A good shader engine should give the artist a fast and robust way to create unique materials. Anything that uniquely interacts with light can be modelled as a material. Marble, wood and water must all be modelled uniquely to produce their respective appearances. Before shaders were introduced, effectively a game was largely rendered as one material, namely the Gouraud shader. In other words, no matter wood or water, all materials would interact with lights in the same way.

In order to have a unique appearance, the obvious solution would be to write unique shaders for all materials you plan to use in a game engine. In modern games with indoor and outdoor spaces, this becomes a daunting task. Obviously a more practical solution is needed.

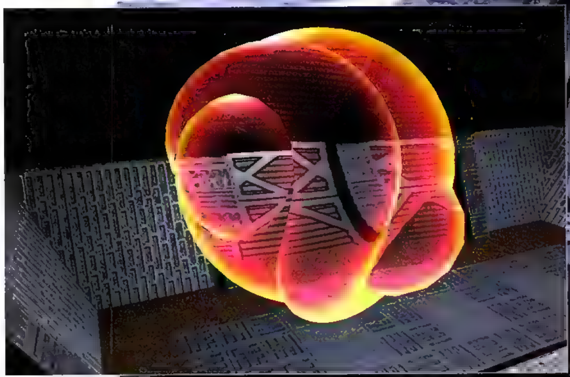
TSE is based on a procedural shader engine. It leverages on the fact that many materials have similar lighting equations. For example, marble and chrome both exhibit a large degree of specular reflection. They differ mainly in that the marble is dominated by a natural pattern (representable by a simple base texture) whereas chrome is dominated by its reflective properties. Essentially, there are certain common light properties that can be used to differentiate materials. TSE exploits this to make writing an extensive shader library more manageable: 'The material system is built on top of standard shader support. Basically, we procedurally generate shaders based on parameters supplied by the artist. They can specify if they want glow, specular, normal maps, refraction, or reflection on a given surface; the materials system then generates a tailor made shader for that material type,' Garney says.

While this is all good, for many independent developers with unique ideas, they may not want to spend time on shader code at all. Luckily Torque is fully loaded to begin with: 'There [are] about a thousand different shader types possible with our current system – each of those thousand shaders has a bunch of different parameters you can tweak. So without writing a single line of shader code, you get a whole lot of flexibility with the materials system,' Garney explains.

## Maintaining sanity

The real difficulty in maintaining a shader engine is making sure it works across the whole hardware spectrum, from simple shader v1.0 in DX8, to the highest v3.0 in DX9. It also has to function flawlessly, be it an NVIDIA or ATI card. Unfortunately some DX9 effects simply can't be reproduced on lower end hardware and it becomes a major problem trying to balance features and getting to the maximum user base. Fortunately, Torque's material system is built with specific fallback rendering paths for lower end hardware. To take care of vendor specific GPU quirks, it also has a card profiler to help create workarounds. Even with these measures though, it's not possible to have full backward shader compatibility. 'Obviously, you'll have to either write specialised fallbacks, or give up effect fidelity, if you're using high end effects and you want to support way down. TSE is a powerful rendering framework, but it can't work miracles,' Garney admits.

After many years of being left behind, we're glad Torque is finally getting the facelift it needs. The procedural shader engine should ease the lives of all who have gone through the days of DX8 assembly horror. Although GarageGames has yet to become the next best thing, it has a solid following and some hit titles. Now with fully fledged shader support, future Torque powered titles can only get more exciting.



**ABOVE:** An example of TSE's per-pixel refraction capabilities.

## Taking Torque for a spin

Check out the Torque engine demos on this month's cover CD for a small sample of what this great engine is capable of, and for more information visit www.garagegames.com JW

# Ground Control II

'And how pretty is *your* engine?' asks Logan Booker.

PC Specs

**Developer:**
Massive Entertainment
*www.massive.se*

**Publisher:**
Vivendi Universal Games
*www.vug.com*

**Distributor:**
Vivendi Universal Games
*www.vug.com*

**Phone:**
Vivendi Universal Games
(02) 9978 7722

☺ Gorgeous graphics and model detail; fast-paced action with realtime strategy.

☹ Laughable voice-overs; lack of building and 'typical' RTS elements may put off stalwart players.

**ABOVE:** Ground Control II's graphics engine is quite awesome for an RTS.

**Realtime strategy is a** presidential suite in the office block of modern gaming. Trying to jam a foot in the door of this luxurious but exclusive dwelling can be as hard as getting into the building itself – and by building, we mean 'the market', and by foot, we mean whatever title you may be trying to wedge between Blizzard's opuses Warcraft III and Starcraft. Massive Entertainment's Ground Control II is another contender in this already overcrowded room of titles.

The game's back story is the brainchild of Joe Dever, author of such books as *The Chasm of Doom* and *The Cauldron of Fear*. This means that the plot is not complete pox. Sadly, the same cannot be said for the character voices or dialogue. Briefly, plot-wise, you're part of a human settlement (the NSA) that is fighting back against its Earth parent (the Terrans), whose army is in the process of conquering abandoned planets from a decade-old war. In order to gain an advantage, both sides take an interest in a mysterious alien technology (the Virons).

But any semblance of seriousness the plot may provide is obliterated by the pseudo-cockney accent of the game's protagonist, Jacob Angelus. May God have mercy on his soul.

GC II's graphics are incredible for an RTS. Pixel-shaded water, awesome terrain detail and complex unit models make it a very pretty game. This is by far its strongest selling point.

In a vein similar to that of Warcraft III, GC II focuses on action rather than economy, and as such, there is no base-building. Troops, purchased with acquisition points, are called in via dropship. Acquisition points are gained by holding victory locations and destroying enemy units. The dropship itself can be upgraded to carry more troops or improve its firepower, and if used appropriately, can be devastating in combat.

Ground Control II certainly won't disappoint in the innovation department. It's a lot fresher than many recent RTS titles, and it has much to offer both veterans and newcomers. Its biggest hurdle? A market dominated by stalwarts.

**Requirements**
800MHz CPU; 128MB RAM; 32MB T&L video card; DirectX 9.0.
**Recommended**
1.5GHz CPU; 256MB RAM; 128MB DirectX 9.0-level video card.

SCORE **8.5/10**

# Red Dead Revolver

Allison 'get your gun' Reynolds whips out the spurs.

PS2 Specs

**Developer:**
Rockstar San Diego
*www.rockstargames.com*

**Publisher:**
Take2
*www.take2games.com.au*

**Distributor:**
Rockstar San Diego
*www.rockstargames.com*

**Phone:**
Take2
(02) 9482 3455

☺ Red is no Roland Deschain, but you can still pretend.

☹ Riding the range is not allowed.

**ABOVE:** Cowboys, mullets and guns. Sounds like a magazine title.

**Yeeeehaw! *insert gunfire sound-effect*** Sit a spell and listen up about this newfangled game Red Dead Revolver (RDR) that's out on the PS2 gaming machinery.

Start with the quintessential cowboy revenge story of a man who has turned to bounty hunting after seeing his parents killed when he was just a boy. Add grainy film effects, perpetual dusty sunset lighting, and a cast of oddball but deadly characters and you have the basic outline of what RDR is all about.

But this third person shoot 'em up is more than a cheesy spaghetti western rip-off.

While you learn the various ways to move and handle weapons as Red, the linear storyline has you gaining clues about the whereabouts of the man that killed your parents.

But you don't stay as Red all the way through. Slipping into the skin of other characters, you learn and play with their strengths and weaknesses as well as diverting from the main storyline.

At the end of each chapter is a boss character that requires some inventive gameplay to defeat. Though this is where one of the game's shortcomings comes to light. There is no consistency to the amount of damage each character can take, some one headshot, some several, and this often leads to frustration.

The game's difficulty level swings between easy and damn hard, but you are assisted along the way with access to some awesome old-style rifles, revolvers and the ability to ride horses and livestock.

Also helpful, bullet-time has been adapted to aid in shootouts with 'Dead Eye' aiming. Dead Eye gives pinpoint accuracy in slow motion, and is deadly once you've mastered it.

Although the single player mode does not allow for much straying off the beaten track, multiplayer gives three more types of game mode. Two are shoot and run, but the third is a cowboy game must have – the quick draw showdown!

This game was another that nearly didn't see the light of day after a couple of false starts. The lighting, quirky speech and gameplay could even see RDR earn a sequel.

SCORE **8.5/10**

'The best car safety device is a rear-view mirror with a cop in it.' – Dudley Moore

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# Thief: Deadly Shadows

Shadowdancer David Kidd goes out clubbing all night long.

PC
Specs

**Developer:**
Ion Storm
*www.ionstorm.com*

**Publisher:**
Eidos
*www.eidos.com*

**Distributor:**
Atari
*www.atari.com*

**Phone:**
Atari
(02) 8303 6800

☺ Fantastic sound, lighting and atmosphere.

☹ Tiny levels, some dodgy physics, lacks originality.

**ABOVE:** 'Who's a deadly shadow? I'm a deadly shadow! Who's a...'

**The news that Ion** Storm would take up where the venerable Looking Glass Studios left off gave us some indication that the Theif series would be in good hands. That is, until Deus Ex 2 turned up. It was a competent title, but if a company can't innovate on its own game, how can we expect it to innovate with someone else's? Now that we finally have our hands on Thief: Deadly Shadows, we can say that Ion Storm has captured the original, but not without some serious compromises.

Garrett's still pounding religious fundamentalists; he's still having his strings pulled by quasi-conspiratorial puppet masters; and he's still a master of gadgets, marksmanship, and clocking someone up the backside of the head with a blackjack. He has some new moves, too. He now makes better use of shadows with a new wall-hugging ability that sees him flatten himself against a wall to further conceal himself.

He also has a new third-person mode that works well, and is a necessity for navigating tight spaces without bumping into things.

Garrett's world has also changed. The lighting effects are awesome, the AI has been kicked up a notch, and the sound is the best you're likely to hear in any game, anywhere. Ragdoll physics is thrown into the mix, but it's not without its problems – too often you'll knock someone out, only to see their body arched back like Linda Blair doing the spider walk in the director's cut of *The Exorcist* – but hurling bodies down a flight of stairs is like an interactive version of Porrasturvat, so it's forgivable.

The last and most worrying thing is the console-friendly design. Levels are designed to run on limited console hardware, meaning that they're shorter and broken up by annoying load times. Those of us who fondly remember the massive rooftop levels of Thief 2 will be disappointed. This is unforgivable for today's PC and an idiotic case of the tail wagging the dog.

In the end, this is a worthy successor to the series. While it struggles to stand up against the sneaker genre's new blood, it's still a fun, moody, well-crafted title that's true to its roots.

**Requirements**
1.5GHz CPU; 256MB RAM; DX9.0a graphics card; 3GB HDD.
**Recommended**
2.4GHz CPU; 512MB RAM; RADEON 9700 PRO, GeForceFX 5800

SCORE **8/10**

# Driv3r

JOhn G1lI00ly flexes some muscle cars.

PS2
Specs

**Developer:**
Reflections
*www.driv3r.com*

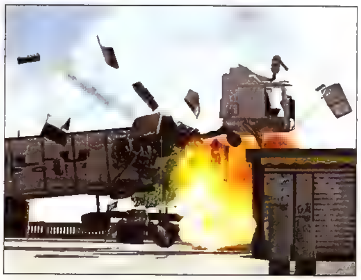
**Publisher:**
Atari
*www.atari.com.au*

**Distributor:**
Atari
*www.atari.com.au*

**Phone:**
Atari
(02) 8303 6800

☺ Great car chase action; well-constructed story.

☹ Woeful on-foot action. Silly name.



**ABOVE:** Driv3r is perfect for recreating that truck scene from *Terminator 3*.

**In striving to bring** the art of the car chase to gamers, Driv3r has always stood above other offerings. At the heart of the series lies a driving model tuned to catching air, cornering on two wheels and knocking boxes flying when hooning down alleyways. Apart from the horrific I337-ification of the name Driv3r, the third instalment offers more of the same, with some obligatory on-foot action as well.

Taking a cinematic approach, the game's main undercover mode has your character, Tanner, dying on an operating table in Tunisia after a shootout. The game then shoots back to six months beforehand in Miami, at which point the story begins to unfold thanks to some slick cut scene work and high-level voice acting from names like Ving Rhames and Iggy Pop.

In the missions that ensue, you will do a hell of a lot of driving, and some on-foot run and gun work. Driving is sublime, with big V8 muscle cars that seethe with power and swim around corners on floaty suspension. Like its predecessors, Driv3r nails the car chase experience, and then enhances it with a Director mode for putting together some dead sexy car chase videos.

But it's when Tanner leaves the car that things go awry. While similar titles like Grand Theft Auto and The Getaway make third-person action fun, Driv3r's third-person mode feels like a poorly built throwback to several years ago. Movement isn't fluid, weapons lack a convincing feel and it is all a little underwhelming, which is a problem when Undercover mode forces you to undertake on-foot tasks at times.

Driv3r is a mixed bag indeed. The driving action that made this series famous is back and better than ever, taking place in three locales: Miami, Nice and Istanbul. And the driving is definitely fun.

However, some niggles like the poorly realised on-foot mode hold it back from being a great title. If you want to re-create your favourite chase from *Ronin*, it is definitely worth a look-see, but as a complete package, Driv3r feels like it is lacking something special.

SCORE **7/10**

'America's one of the finest countries anyone ever stole.' – Bobcat Goldthwaite

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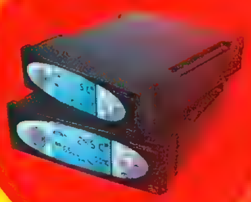

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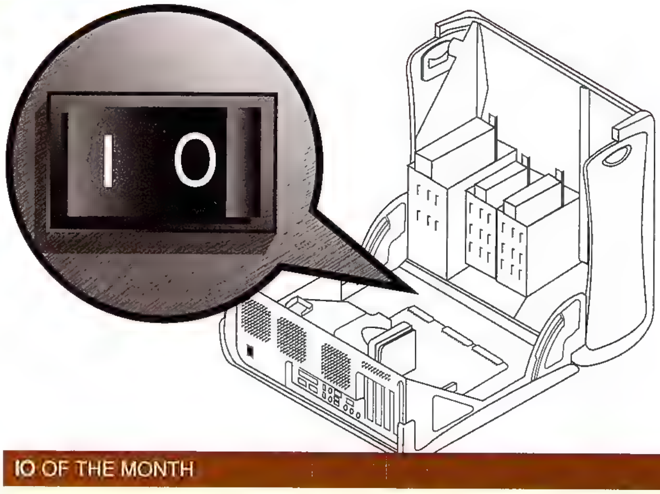

**IO of the month wins a Logitech MX700!**

Throwing street directories into fires!
**io@atomicmpc.com.au**

## IO OF THE MONTH

## Copper cases?

I I was looking over *Atomic issue 40*, where you had the review on the 2004 GT Edition 3D Cooler-Ultra, and I began to wonder – if all of the top end heat sinks are made from copper, because copper is very good at dispersing heat, why don't Antec and Lian Li begin making copper cases? They would disperse heat extremely well and ensure that us overclockers have an extremely cool PC!
Andrew Stewart

**ABOVE:** Copper is great for heat sinks, but don't get carried away.

O Nobody makes a copper computer case because it'd be very expensive, and very heavy, and prone to fold up like a concertina if anybody sat on it.

Copper is a very tough metal – whack it with a hammer and it'll dent but not shatter or tear – but it's not a very strong one. This is why copper heat sinks seldom use copper for their structural components – the frame that holds the fan, for instance. That'll be steel, or aluminium, or really *hefty* copper.

You could make a copper case as rigid as an aluminium one, if you used a lot of metal to make it. But since copper's more than three times as dense as aluminium (it's 14 percent denser than iron), a case made from mighty girders of the stuff would weigh a great deal indeed. A few decorative panels and, maybe, drive bays are one thing; a whole copper frame is another.

There are exotic copper alloys that have some properties approaching those of steel alloys. Beryllium copper, for instance, is good for making springs. You could make a case out of that, and it wouldn't weigh much more than an equivalently strong steel case. But a whole case made of beryllium copper would cost a fortune (the raw metal sells for something like $80 a kilo...), and anybody who cut a hole in it for a side window would be poisoned if they breathed the dust!

In any case, the material a PC case is made from makes little difference to its cooling. Throughflow ventilation is what matters. This is why people can make computers with wooden cases that work perfectly well; almost all of a PC's cooling is done by its fans, not by its metal.

## Salvaged speakers

I A couple of days ago, some mates and I were cleaning out my garage, when we stumbled upon an old pair of Pioneer speakers that I never knew I had. I decided that they would look kinda cool attached to my stereo, so I stripped them back.

Then came the moment of truth – seeing whether they actually worked.

I hooked them up, and... nothing. In desperation, I asked my uncle what might be wrong. He said that I needed an amplifier or a pre-amplifier, I forget, I asked what sort, but he didn't know, and so I turn to *Atomic*. Do you have any idea what sort of amp I would need? The speakers say 'Max Input – 18W, Impedance – 8ohms'.
Ry

O In days gone by, sound cards had titchy built-in power amplifiers with a watt or three of quite badly distorted power per channel. With an adaptor cable, you could just plug plain old speakers straight in, and get more than adequate volume for desktop purposes.

Modern sound cards don't have amps. They can't drive anything more challenging than headphones directly. So yes, you need an amplifier.

You don't need a *fancy* amplifier, though. Any old stereo receiver from a garage sale, or wherever, will do. All you ought to need to connect it is a 1/8th inch stereo plug to twin RCA plug adaptor to hook up the computer's line-out to your amp's aux-in. If the speakers have the usual bare wire leads, you ought to be able to connect them to the back of the amp with spring clips or screw terminals, so you shouldn't need an adaptor there.

Just remember to connect the speaker wires the same way around on both sides; one wire will have printing on its insulation, or will be a different colour, and that wire should go to the same terminal on both sides. It can be stripe-wire-positive both sides or stripe-wire-negative both sides, but not positive one side and negative the other, or your speakers will be out of phase.

As PCs provide volume-controlled line level output, a simple power amplifier is all you need; you don't have to have an integrated amplifier (with its own pre-amplifier, so there's a volume knob on the amp) or a separate pre-amp. Cheap second hand amps are usually integrated amps, though, or receivers (integrated amps with a radio tuner built in).

'But a whole case made of beryllium copper would cost a fortune (the raw metal sells for something like $80 a kilo...), and anybody who cut a hole in it for a side window would be poisoned if they breathed the dust!'

O 'Last night I stayed up late playing poker with Tarot cards. I got a full house and four people died.' – Steven Wright

## Double barrelled DSL

Our office is looking to get a second ADSL service to use as backup when our primary (BigPond) ADSL goes troppo. Is it possible to use ADSL modems in tandem, to obtain greater bandwidth when both services are running?

Daniel Black

Yes and no. Mainly no.

'Aggregating' two DSL connections – making them look like one connection, so that you can download a single file as fast as you'd expect by adding the speed of the two links – is something that your ISP has to support. Multilink bonding is not going to happen with any consumer DSL product, probably not going to happen even with current Australian commercial DSL products, and *definitely* not going to happen when one line is from one ISP and the other is from another.

**ABOVE:** It took these beasts to beat Kasparov. Most of us lose to chess computers that run on AA batteries.

If all you want is load balancing, though – where you use both connections at once, but not for the same thing simultaneously, so one client can be downloading two files and get each down a different pipe – then that may be doable. It's still not straightforward, though; if you're trying to use two connections simultaneously, you're showing two different IP addresses to the internet, and if your LAN's internet access is shared evenly between those two connections then you'll have various client machines that seem to be flickering from one IP address to the other, which'll screw things up royally. But it can be done by someone with adequate networking chops.

A dedicated appliance (like this one, perhaps: www.firebrick.co.uk) is certain to be the most straightforward solution, but you'd want to check carefully to make sure that it'll work in your situation before you buy. GNU Zebra (www.zebra.org) running on a Linux or FreeBSD box can also apparently get this job done.

## Chess complexity

After reading the supercomputer article in *issue 40*, and in particular the insert about Garry Kasparov and IBM's 'Deep Blue', I was left wondering why it took a supercomputer to beat a human at chess.

It's chess – there can't be *that* many instructions involved to not only calculate the computer's own moves, and all of the opponent's counter-moves. Why does chess seemingly overwhelm the desktop processor?

Kris

The number of possible positions of all of the pieces on a chessboard is staggeringly high. Even if you only look at all possible chess *games*, you've *still* got more of them to think about than there are atoms in the universe.

Yes, more or less 'brute force' chess computers can already beat all but the very finest human players with no trouble, and will be generally superior to all of us meatbags not very long from now. They'll still be a long way from playing truly *optimal* chess, though.

A lot has been written about this; check out en.wikipedia.org/wiki/Computer_chess for starters.

## Tell-tale telltales

A while ago I heard somewhere that people (government officials...) may have been able to see data sent over modems just by recording the lights on the front. I have recently brought this up and have been laughed at, and I was just wanting to know if this is really that far-fetched?

I would have thought it was possible, but I just can't find any info on it.

James Wilson

Yes, it is possible, in some situations at least. It could also be done, in theory, with network switches, routers and anything else that blinks an LED to indicate data traffic.

LEDs respond very quickly – in the tens of nanoseconds. Even 50ns response time means response way up into the megahertz range.

This'll only be an issue, though, if the LED blinking is directly driven by the stream of bits – on for a one, off for a zero (or vice versa, or blinking when 0-to-1 or 1-to-0 transition happens, or whatever). If the LED indicates anything with a bigger granularity than that (like, for instance, blinking once when each multi-bit baud unit of a modern dial-up modem goes by), you can't read the data stream from it. Network card activity lights, for instance, seem to generally just latch on constantly when the card's sending or receiving.

**ABOVE:** Stop those government departments from spying on your modem! Burn it! *Burn it!*

You can't tell just by looking whether an LED is blinking zillions of times a second, or glowing constantly; you have to point a similarly speedy photosensor at it and plug the output into an oscilloscope or frequency counter or something.

The first article about this was linked and discussed on Slashdot some time ago: www.slashdot.org/articles/02/03/06/1221224.shtml. It's an extension of existing 'TEMPEST' data security ideas: en.wikipedia.org/wiki/TEMPEST.

There have been a few other related developments since. Differential power analysis, for instance: www.cryptography.com/resources/whitepapers/DPA.html.

...and acoustic analysis: www.slashdot.org/article.pl?sid=04/05/08/117242 (which gets no respect in the RISKS Digest: catless.ncl.ac.uk/Risks/23.37.html) ...and even keyboard click analysis: yro.slashdot.org/article.pl?sid=04/05/13/0238204.

Address bus snooping to crack security features in certain sold-at-a-loss consumer computing hardware is also somewhat relevant: www.xenatera.com/bunnie/proj/anatak/xboxmod.html DR

Simon Peppercorn supplies more sizzling Windows tweaks for amazing *Atomic* freaks!

With the number of budding or established digital photographers and artists making use of Photoshop as their preferred image creation/manipulation tool, here are a few Photoshop-specific tweaks which may help it perform just that little bit better.

## Zooming in on the cache

To allow high-res images to be redrawn at reasonable speeds Photoshop, from version 4 onwards, employs the use of image caching. It actually displays a series of up to eight (the default setting is four) low-res images, updated as changes are made. Each of these low-res images consumes resources.

If you are often editing images at zoom levels of less than 100% then you may find it useful to change the number of cached images. Basically, each cached image is a down-sampled version of your master image, for each zoom increment. The default setting of '4' caches the first four zoom-out levels of 66.7%, 50%, 33.3% and 25%. Bumping the setting up to 8, will cache zoom levels all the way down to 6.25%. Handy if you work with amazingly large images.

In Photoshop, select Edit -> Preferences -> Image Cache and in the 'Cache Levels' text box, enter a value from 1 to 8. Entering '1' disables image caching entirely. This is great if you are low on resources. Maxing out to 8 will eat away more RAM and scratch disk space, but improve image redraws as you edit. You will need to restart Photoshop for the setting to work.

## Flicking channels

Each image is composed of a number of image channels or, as you build your composition, there may also be a number of layers. If you are into the use of filters then try applying a filter to an individual layer, channel, or multiple channels rather than the entire image. This will require less memory and improve performance. When your work is complete you will find that by merging individual channels together, as you no longer need them, you will conserve resources and reduce file size.

## Photoshop CS file browsing

The Photoshop 'File Browser' tab allows you to trawl through your image libraries, to view thumbnails and image details. Photoshop CS extends this function by adding the ability to sort, tag and add metadata or keywords.

By opening a folder within the 'File Browser' tab, thumbnails for all the images are created. While this is happening, performance of other tasks is affected. Once the thumbnails are rendered, they are cached to memory. This eats away those important resources you may need for other stuff. By tweaking the preferences in Photoshop CS a little, we can reduce the performance hit. First, try reducing the size of the thumbnails themselves. This immediately decreases the amount of cache memory required. You can turn off the option to render thumbnails for vector files as well. Thumbnails are only a graphical reference of the original image, so don't need to contain excessive detail. Finally, disable 'High Quality Previews'.

## Honing RAM

We all know that there is no such thing as too much RAM. And Photoshop heartily agrees with that sentiment. It prefers to use available RAM rather than the swap file. When it does turn to the hard disk, it uses its own virtual memory called a 'scratch disk'. You can configure the location of your scratch disk from within Photoshop, and ideally this will be on a separate physical hard disk to allow for the best performance. Even better, however, is to make sure that you have enough system RAM to do the job. In other words, more RAM should be allocated to Photoshop than the largest file you might work with. Anything less and Photoshop is not working as efficiently as it could.

To check how it's performing, click on the small triangle on the bottom border of the Photoshop application Window and in the menu that appears select 'Efficiency'.

On the left you should now see 'Eff: 100%'. A value of less than 100% means that Photoshop is relying on its scratch disk and performance is taking a hit as a result.

To bump the amount of allocated memory, click Edit -> Preferences -> Memory & Image Cache and bang in a number that's not larger than the amount of physical RAM you have but still leaves around 64MB, which should be enough memory for Windows to do its thing.

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## UT2004 tweakage

Try these tips to help make UT2004 a little more playable on ageing boxen.

First backup the ut2004.ini file, then open it and, depending on your chosen video renderer, find either [D3DDrv.D3DRenderDevice] or [OpenGLDrv.OpenGLRenderDevice] and edit the following settings:

```
MinDesiredFrameRate=35.00000
```

UT2004 tries to keep a constant framerate, using this setting as a minimum. If you start dropping frames due to the amount of detail or textures, the engine will sacrifice visuals to keep up with the specified fps. Lower the number to improve your framerate and increase it to improve graphical goodness.

```
UseCubemaps=True
```

Used to improve the effect of reflective surfaces. Setting it to false will improve performance, and you should barely notice the image difference.

```
UseVSync=False
```

May fix some graphics problems such as image tearing if you set it to True. (You may or may not take a performance hit.)

```
DesiredRefreshRate=60
```

If VSync is True then this setting will lock in your refresh rate to whatever you put in there. Ideally set it to the highest refresh rate your monitor can handle.

```
OverrideDesktopRefreshRate=False
```

If set to True, this will do as it says. Although if you already set your refresh rate as above, this setting has no effect.

```
UsePrecaching=True
```

Loads textures to cache, improving performance between level changes and so on, although it does increase load time and will fill your memory quite fast.

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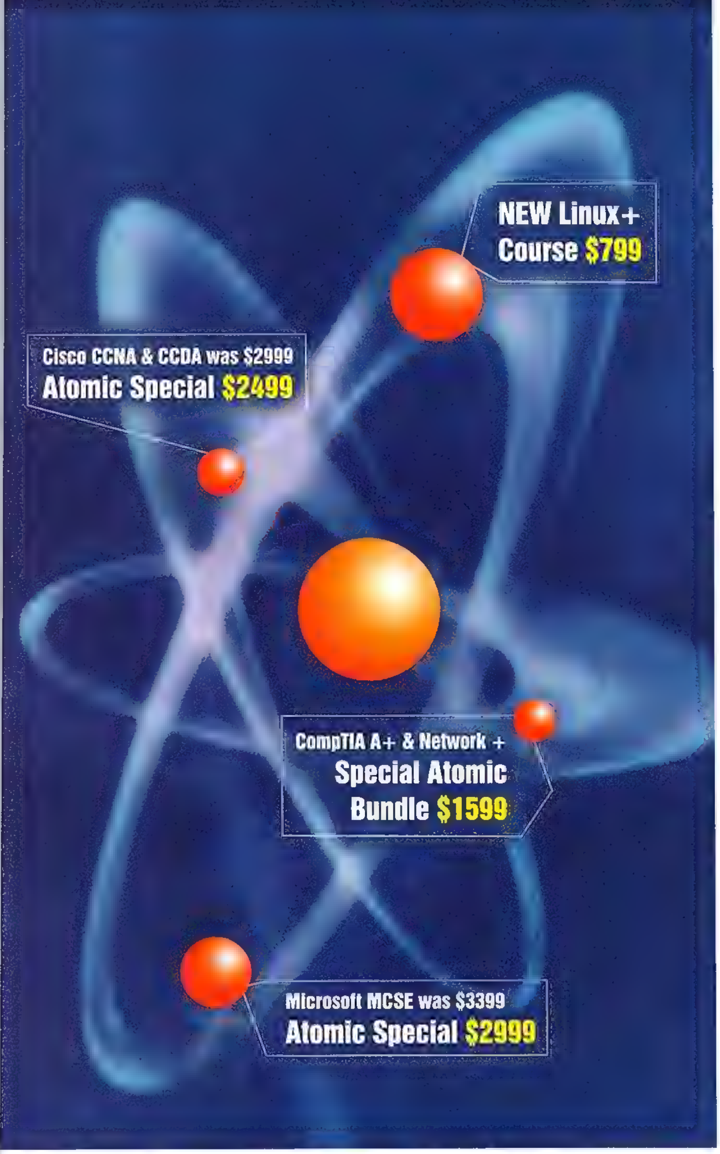

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Peter Sbarski sends you on another journey to unlock the secrets of the penguin.

## Globs

Glenn Trigg sent us an email saying that all true Atomicians should only use the Z-shell. He also sent us a number of tips for the Z-shell including this one about 'globs'. Thanks Glenn!

Globs are the things you may currently think of as 'wild cards' – the special things you type to match many files with one 'word'. A simple glob example is 'cat*' which would match all files and directories (and pipes, etc.) that have names starting with 'cat'.

Note that globs are different to regular expressions, so don't get them confused.

Zsh has an extended form of glob syntax which makes it extremely flexible to match specific sets of filenames with short glob patterns. Here are some examples:

`ls -d *(/)` – This will list only the names of the directories contained in the current directory. Try running this one in /usr/lib.

`ls *(.)` – This lists only the plain files (ie: not directories) in the current directory.

`ls **/*.c` – This will recursively list all files ending with .c from the current directory down.

`chmod go+rx **/*(/)` – This will recursively change the permissions of all directories from those in the current directory down to enable read and search permission for group and other.

`ls -ld *(m-2)` – List all entries in the current directory which have been modified in the last two days.

## PearPC

In case you somehow managed to avoid all news about PearPC, well, let me tell you that you are not getting away that easily. Sebastian Biallas and Stefan Weyergraf have managed to create a working PowerPC emulator powerful enough to run Mac OS X on a PC and, what's more, it works wonderfully. The emulator is very slow but these are early days yet and with a small amount of tweaking you can make it a little faster. Try the following tips:

☐ Download the CVS copy of PearPC from Sourceforge and compile it on your system.

☐ Use the flags given in Linux Tweaks, *issue 42*, to create a version of PearPC optimised specifically for your architecture.

☐ If you have a relatively fast computer, in the PearPC configuration file set the redraw interval to 50 or 40. A lower redraw interval will make PearPC run faster but it will also make it less responsive.

☐ Increase the amount of memory size allocated to PearPC. By default PearPC takes up 128MB of RAM. If you can spare more – do it. If you look at the configuration file, the amount of RAM allocated is referenced as a hex value. To get the right value, multiply the amount of RAM you wish to allocate, in the decimal system, by 1024 and then again by 1024 and then convert it to hex. For example, if you want to allocate 384MB, multiply 384 x 1024 x 1024 (= 402653184) and convert it to hex (18000000).

## Reader feedback

We've had a number of readers send us a comment or two regarding the tip 'Servicing Linux' published on *page 71* in *Atomic 41*. One comment was that we should have mentioned that `/sbin/chkconfig` and `/sbin/service` utilities are not available on all distros.

Another comment was that, after stopping a service, a reboot is not necessary to unload it from memory. That's right; we are talking about Linux here and not some other OS! Instead of rebooting you can simply restart the current init process. A special thanks goes out to Mr.Tux and Glenn Trigg.

## Bad symbolic links

This function will look for bad symbolic links in the current directory and all subdirectories below it. It will then automatically delete them. Now, try doing that in Windows!

Note that you can simplify this function by deleting the symbolic links as soon as they are found rather than copying them to a list and deleting them later. The idea for detecting faulty symbolic links was originally proposed in the Advanced Bash-Scripting Guide (www.tldp.org/LDP/abs/html), which I suggest you have a look at if you are interested in bash scripting.

```
    function badlink()
    {
        RED='\E[1;31m'; BLUE='\E[1;34m'; GREEN='\E[1;32m'
        DEFAULT=$(tput sgr0); FILELIST=.badlink.list

        [ -e $FILELIST ] && $(rm -fr $FILELIST)

        function checklink() {
                for badlnk in $1/*; do
                        [ -h "$badlnk" -a ! -e "$badlnk" ] && echo
\"$badlnk\" >> $FILELIST
                        [ -d "$badlnk" ] && checklink $badlnk
                done
        }

        for directory in pwd ; do
                        if [ -d $directory ] ; then checklink $directory; fi
        done

        if [ -e $FILELIST ]; then
                for line in $(cat $FILELIST); do
                        echo $line | xargs -r rm | echo -e "$line -$RED
removed $DEFAULT"
                done
                rm -fr $FILELIST #delete our temporary file list
        else
                echo -e "$BLUE Bad $DEFAULT symbolic links $GREEN not found
$DEFAULT"
        fi
    }
```

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# The *Atomic* hardening guide

Security isn't just for big business or the corporate network, some principles are just as applicable to the home as well.
Ashton Mills shows you how.

A wise geek once said that the only truly secure machine is one that is turned off, buried in a bunker, and guarded by an army of crack ninja tea ladies wielding the latest in anti-personnel caffeinated beverages.

But such a system isn't terribly accessible and, therefore, helpful. So given our machines *have* to be connected to the wider world, securing them is rather a matter of making them less open to abuse, less vulnerable, and ultimately as impenetrable as possible – hardened.

The process of hardening crosses all boundaries of an operating system – from system settings and kernel to services and software – and is aimed at one goal: to reduce the attack surface of a machine as much as possible. Be it a malicious program or a user sitting down at the keyboard, every conceivable and unconceivable threat needs to be considered.

For large networks and businesses this can be an involving and exact science. But the process of hardening can be useful even to the SOHO business and the rest of us running gateways or machines directly connected to the internet at home.

So with this in mind we've whipped up a mini-hardening guide of the key steps to take, primarily for Windows but with a few notes on Linux, to reduce the vulnerability of your systems and, as a result, make them more secure.

## 01 Firewalls and filtering

You already know this one, but it's part of the hardening package. More than that it's the single largest step you can take for a more secure system – if all ports bar essential services are closed, you drastically reduce the attack surfaces of your machines or network.

It's for this reason that every machine accessible via the internet *needs* a firewall, either on the gateway to the Net or the machine itself. Given the huge variety of firewalls available, from self-contained hardware devices to software firewalls for all major operating systems, there's no reason not to be running one.

While Windows XP does come with a built-in firewall (Internet Connection Firewall) it's a poor implementation. Thankfully there is a range of easy to install 'personal' firewalls freely available for the masses of broadband-connected home machines out there.

While firewall feature sets can differ, be sure to choose one that can block trojans – programs that you want to stop getting *out* from your machine.

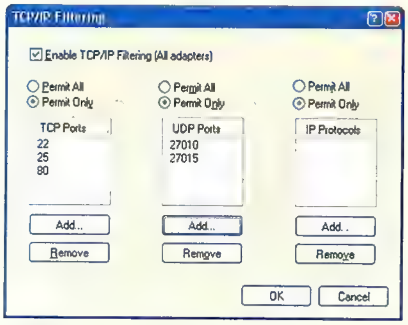
This is quite a focused application of a firewall and works by blocking outbound ports commonly used by trojans to prevent them sending information out. For this to be effective, the list of known trojans needs to be kept relatively up-to-date.

Whatever firewall you decide upon, make sure that at the very least inbound and outbound traffic is blocked for TCP and UDP ports 135, 137, 139 and UDP port 138. These are notorious ports through which Windows machines running file and print sharing can be compromised. Blocking these prevents intruders from gathering useful information such as usernames, computer names, and services, not to mention preventing access to shares.

Alternatively, and if you're paranoid, you can also enable device-based inbound TCP/IP filtering on a per machine basis and only explicitly enable ports for a given service. From your Network Connections simply right click on a device and select Properties --> TCP/IP --> Properties --> Advanced --> Options --> Properties.

If you choose to open ports for services such as SSH, FTP, or VNC, consider configuring them to use different ports than the defaults to at least hide the services from port sniffers scanning common ports.

Linux distributions almost always come with a powerful firewall configurable through the 'iptables' command. Its power is belied by its complexity however, so if you're new to Linux firewalls grab any one of hundreds of firewall scripts online (www.linuxguruz.com/iptables), or try your hand at *Atomic*'s own Linux firewall (www.atomicmpc.com.au/files/atomic-kit.tar.gz).



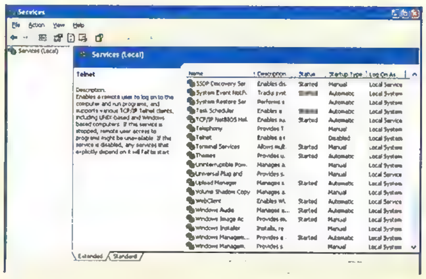
☑ Enable TCP/IP Filtering (All adapters)

○ Permit All
● Permit Only
TCP Ports
22
25
80

○ Permit All
● Permit Only
UDP Ports
27010
27015

○ Permit All
● Permit Only
IP Protocols

**ABOVE:** TCP/IP filtering – the poor man's firewall.



**ABOVE:** Disabling unnecessary services is an important step for hardening your system.

## 02 Disabling services

Even with a firewall it's important to disable any unnecessary services on a machine directly connected to the internet.

Services are still software, and software is prone to vulnerabilities. The less services you run, the smaller the attack surface of your machine. If for example your gateway box doesn't need file sharing, turn it off. Even if the firewall is blocking these ports, should your system be compromised through another means the malicious software could then use running services to spread further.

Click Start --> Run and type in 'services.msc'. With Windows XP the most important services to disable if not already (right click and select Properties --> Startup Type --> 'Disabled') are:

```
Remote Access Auto Connection Manager
Remote Access Connection Manager
Remote Desktop Help Session Manager
Remote Registry
Server
Telnet
```

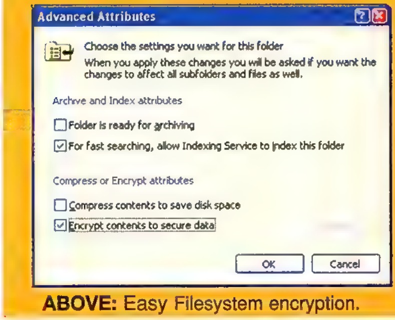
If you wish to keep file sharing, don't disable 'server'. If sharing is necessary, be strict with access. If you're using a Windows Server build, you'll have additional services you should consider disabling. If you use FTP, disable the default guest account to enforce logons only with user accounts (see step 03).

Similarly the range of services under Linux can be huge depending on the type of install. Use accompanying documentation to determine what you do and do not need, type `cat /etc/services | less` to see a list of common services and ports, and use the distribution's tools to disable unnecessary services.

## Hands off!

Depending on your environment, physical security may be a concern. The ultimate access is at the machine itself, so securing the box to prevent theft is considered handy. To a lesser degree, password protecting the BIOS and disabling boot floppy or CD-ROM access makes it hard for people to sit down and boot an alternative OS to gain access to your drives.

If you're using Windows XP you can also enable filesystem encryption (right click on a directory or file and select Properties --> Advanced), securing your data from alternate logons or if your drives find their way into someone else's system.



Choose the settings you want for this folder

When you apply these changes you will be asked if you want the changes to affect all subfolders and files as well.

Archive and Index attributes

☐ Folder is ready for archiving

☑ For fast searching, allow Indexing Service to index this folder

Compress or Encrypt attributes

☐ Compress contents to save disk space

☑ Encrypt contents to secure data

**ABOVE:** Easy Filesystem encryption.

The Atomic Security Kit

On this month's cover CD you'll find a hand-picked selection of some of the best software to help protect your system including firewalls, virus scanners, spam filters and anti-spyware tools. It's *Atomic* loving for your PC!

## 03 System settings

There are a number of changes you can make to system settings to ensure a more secure platform.

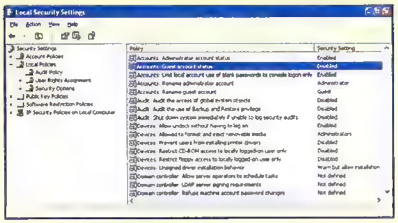
First, open up Control Panel --> System --> Remote and make sure 'Remote Assistance' and 'Remote Desktop' are not enabled.

If you use Windows XP Professional, next click Start --> Run and type in 'secpol.msc'. This is the security settings management console, and allows us to edit the security policy for the system.

There's a lot you can tweak here, but we'll just focus on a few items. Click Local Policies --> Security Options and set 'Accounts: Guest Account status' to disabled.

Then, as malware has been known to search for and abuse the Administrator account, rename it with the 'Accounts: Rename administrator account' option ('Gigantor' or '1337h4x0r' are two clearly viable alternatives).

Now it's time to delve into some registry tweaking goodness. Click Start --> Run and type in 'regedit', then select any of the following tweaks opposite to your liking.



**LEFT:** Disabling the Guest account through the security settings management console.

- By default Windows allows non-authenticated users to view domain and share names, which could prove useful to intruders. Prevent this by setting the DWORD value:

```
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Lsa]
 'RestrictAnonymous' to 1
```

- To prevent ordinary users from viewing Application and System logs set the DWORD value:

```
 'RestrictGuestAccess' to 1
```

In both:

```
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\EventLog\Application]
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\EventLog\System]
```

- For a little bit of local security, if you want to prevent the last user's login name displaying at the login prompt, create and set:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon]
'DontDisplayLastUserName' to 1
```

- In the same key you can prevent shutdowns from unauthorised (ie: not logged in) users by setting the string value:

```
'ShutdownWithoutLogon' to 0
```

- To prevent remotely connected users from viewing the registry, set the following string value:

```
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\SecurePipeServers\Winreg]
'Description' to 'Registry Server'
```

- By default the page (swap) file is reused between boots and never cleared, which could well prove an information resource for intruders. Ensure the page file is created anew at boot by setting the following DWORD value:

```
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\Session Manager\
         Memory Management]
'ClearPageFileAtShutdown' to 1
```

- The standard administrative shares (for example C$ or ADMIN$) created by Windows are accessible even though they don't show up through network browsing. Disable sharing of any administrative resource by creating and setting the BINARY value:

```
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\LanmanServer\Parameters]
'AutoShareWks' to 0
```

Linux, naturally, is a whole different posse of penguins that we don't have full scope to cover here. That said, unlike Windows, you can actually download specially 'hardened' versions of the Linux kernel containing built-in security features such as GRSecurity, SELinux (Security Enhanced Linux, developed by the US National Security Agency) and patches to TCP/IP to detect and spoof scans by programs like *nmap* (fool the port scanners!)

## 04 Passwords

Operating system agnostic, you might think this is a somewhat obvious topic, but the truth remains that passwords are an Achilles heel. Simple passwords are easy to remember, and easy to crack. Complex ones, while harder to break, cause people to write them down to aid remembering them. Not the best idea for an office environment, or if you want to prevent siblings logging into your account.

Most importantly, however, is that even if you don't use complex passwords for machines behind a gateway, it's absolutely essential for the Administrator or root password of any machine directly connected to the Net to be a traditional complex password. The rules here are simple:

- Must consist of at least six characters.
- Must contain a mixture of letters, capitalisation, and numbers.
- Must not contain any personal or user account details.

You can enforce this if you wish in secpol.msc by drilling down to Account Policies --> Password Policy and setting 'Minimum password length' to six characters and enabling 'Password must meet complexity requirements'.

## 06 Patching and updates

A firewall, good anti-virus and anti-spyware software, and stringent system settings can help reduce the attack surface of a machine – but it won't necessarily stay that way. Bugs, exploits and vulnerabilities in application software, services and even the operating system itself are routinely discovered and when they are there's always going to be someone to take advantage of them. Vulnerabilities in key components such as Internet Explorer or Outlook regularly lead to a new wave of viruses as virus authors attempt to exploit them while they can.

So while you can do your best with what you've got to harden your system, you can't help an inherent flaw in the software. For this reason it's common sense to install all Service Packs, Hot Fixes, updates and patches when and as they are released.

Make time to regularly check the Windows Update service (windowsupdate.microsoft.com) and the Office update service (office.microsoft.com/OfficeUpdate). If a major virus outbreak occurs and your machine gets infected, you will often find a free pinpoint virus removal tool just for that infection available from McAfee (www.mcafee.com) or Symantec (www.symantec.com) before some definitions get updated.

Keeping your system patched and up-to-date is essential to keeping a secure machine, regardless of operating system.

## 05 Viruses and spyware

Viruses are a part of the online climate these days as much as lag spikes and server downtimes. Don't assume your systems will never get infected. One of the key tenets of network security is that an intrusion is only a matter of time. Even the most experienced geeks get bitten, so it's always wise to have a virus scanner installed.

It's wiser still to actually update your virus definitions once in a while too.

It is largely because of the effectiveness of firewalls that modern malware knows better than to tackle security head on, preferring instead to simply side step it. Most virus infections occur as a result of social engineering, all thanks to the doughy bag sitting between monitor and keyboard that opens email attachments before considering what they actually are. Once inside viruses can replicate themselves out over the network or send themselves to other users through email. It only takes seconds.

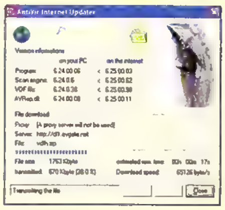
Technically, you should have a virus scanner running all the time, checking applications as they load. And certainly configure the machines of non-geek friends and family this way. But resident scanning takes up resources and slows down application loading, so for yourself it's usually enough to just remember to scan your system once a month or at the first sign of something dodgy going on.

Unfortunately, dodgy behaviour is no longer just the domain of viruses. These days a recalcitrant sibling by the name of *spyware* is increasingly using tactics similar to viruses to embed themselves in your system.

Usually spyware is mild and, at best, monitors your activities for tracking habits. At worst, it can attempt identify theft. Don't underestimate how nasty these programs can be: for home users spyware is in many ways a greater threat than viruses, as spyware can include keyboard loggers which – if you online bank – pose an obvious and serious threat.

Again, constant vigilance isn't necessary, but regular checks are. Whichever scanning packages you choose to use, keep them updated with the latest definitions for the scum they are trained to find.

Linux, by and large, is free of spyware and virtually free of viruses. Inherently Linux has stronger access controls that can limit the damage any potential virus can do, but this isn't protection in and of itself. As Linux grows in the desktop market virus authors will turn their attention to it and, in time, we may start to see Linux viruses.



**ABOVE:** Up-to-date anti-virus software is a key component.

## 07 Testing and maintenance

So you've done all these steps are you're confident your system is a little more hardened than when you began, but how do you know?

First make sure your firewall is doing its job. Head to scan.sygate.com or www.dslreports.com and perform all TCP and UDP scans against your firewall. Note the DSLReports service is more comprehensive but requires (free) registration to use.

Next head to www.microsoft.com/technet/security/tools/mbsahome.mspx and download Microsoft's excellent MBSA (Microsoft Baseline Security Analyser), install it and run it. This handy program checks your system against a variety of common and uncommon security flaws in your software, services and system settings. You'll note recommendations for some of the steps you've already done above, but it may pick out more specific to your system and installed software. Follow them all.

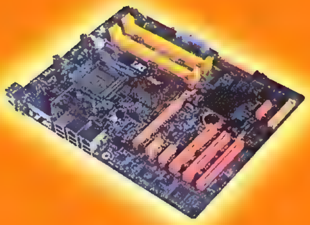
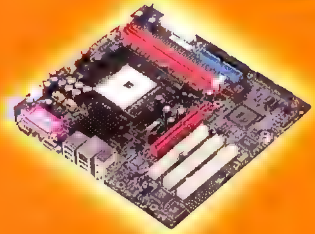
Last, it can be handy to enable security logging to see the results of various activities on your system. Using secpol.msc again, click Local Policies --> Audit Policy. Set the level of policy you wish for each entry – such as auditing successful privilege use, failure of system events, or the success and failure of logon events. Keep in mind that your logs could fill quickly, so don't be overzealous.

You can view these logs, along with the System and Application logs, through Start --> Programs --> Administrative Tools --> Event Viewer.

## Conclusion

While only a short guide these steps are the most important for ensuring a secure system. Keep in mind however that nothing can ever be completely secure and that, more than anything else, good security is as much about habit as it is about procedures and tools. Keeping yourself informed is useful, and a great place to start is www.securityfocus.com.

Now when you go to bed at night with your gateway humming peacefully downstairs, you can rest easier knowing it's not just a usual run-of-the-mill *Atomic* beastie – it's a hardened *Atomic* beastie as well.

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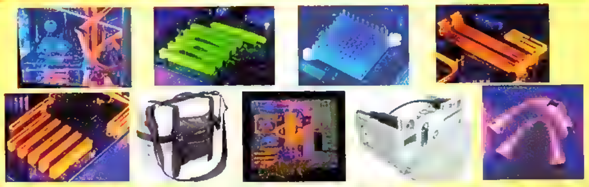

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Design for Innovation

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**Q** What was the name of the project that eventually gave birth to MP3?

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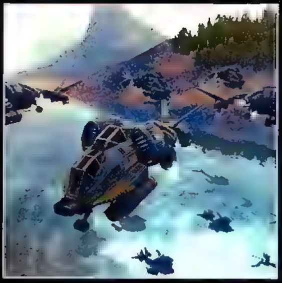
**Q** How long did the 1941 siege of Leningrad last?

## 3 x Star Trek: Voyager Season 2 DVD set

Such a timeless piece of entertainment as *Star Trek: Voyager* should be a compulsory part of every home DVD library. Delving into this futuristic space opera, you'll find the 10 episodes included in Season 2 are truly some of the best. Get in touch with the true warrior in 'Initiations', see a different kind of San Francisco in 'Non Sequitur', and reminisce with the Godfather-like moments of the Kazon in 'Alliances'. With almost 10 hours of *Star Trek: Voyager* bliss to be viewed you'll melt into the couch with the remote infused to your fingers! Thanks to Paramount we have three of these fantastic sets to give away.

**Q** In what episode does Q make his first appearance in *Voyager*?



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**Q** Name the three factions in Ground Control II?

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*Atomic 41 winners:* Star Trek Mouse and mouse pad + ST: Voyager DVD box set and ST: DS9 Season 7 DVD box Set Q. What was the name of the chief medical officer who was killed in the first episode of *Star Trek: Voyager*? A. Dr Fitzgerald. T. Butler, Dongara, WA. 5 x copies of Battlefield: Vietnam Q. According to Lt. Co. Kilgore, what does napalm smell like? A. Victory. S. Hoffman, Green Point, NSW. N. McCray, Wynyard, TAS. O. Gill, Wellington, NZ. G. Che, Earlwood, NSW. A. Garland, Palmerston North, NZ. Zalman Reserator 1 from Altech Q. In *Terminator 2: Judgement Day*, what was the codename of the liquid-metal chasing John Conner? A. T-1000. P. Tse, Jerrabomberra, NSW. 5 x RalliSport Challenge 2 for Xbox Q. What do the engines of the Dodge Viper, Lamborghini Gallardo and BMW Concept M5 have in common? A. V10 Engine. E. Oliver, Riverside, TAS. G. Wong See, Concord, NSW. M. Walsh, Warradale, SA. M. Podgorski, Gladstone, QLD. T. Foster, Kuraby, QLD.

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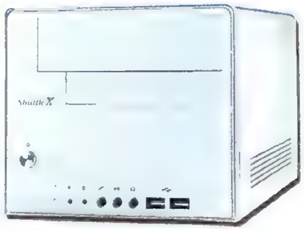

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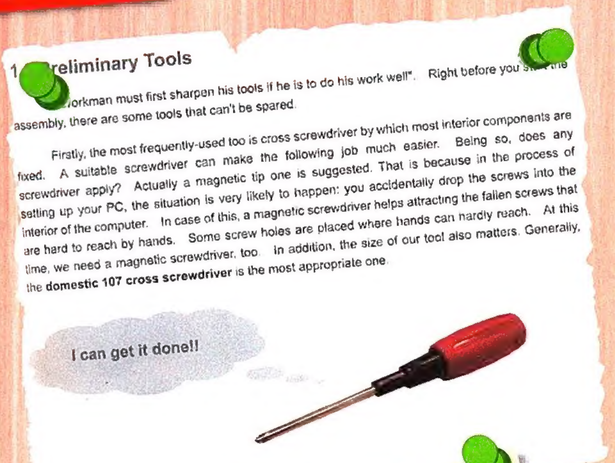
# Lost in Translation

As writers, we here at *Atomic* have a nose for the English language, so it always gets us excited when we see English used in, um, *different* ways to how we normally see it. So welcome to Lost in Translation, our new section devoted to the weird and wonderful ways in which words can be used.

The pieces here all come from genuine sources, we don't need to make any of this up. But we do have a policy of not naming the sources, this is about amusement, not having a go.

We are happy to accept submissions for Lost in Translation. If you find something whacky and wonderful in a manual, on a box, in a lift or wherever, take a photo or scan it and send it through to wtf@atomicmpc.com.au

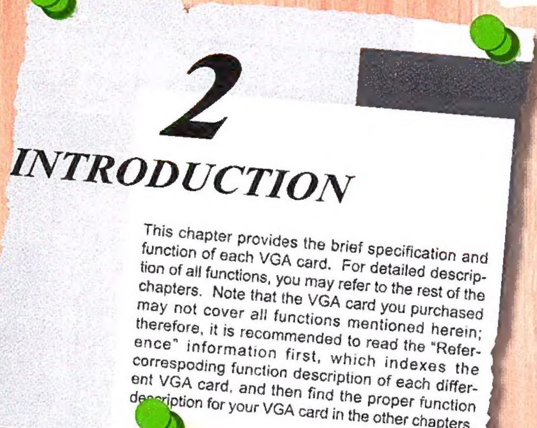


1 reliminary Tools

orkman must first sharpen his tools if he is to do his work well". Right before you the assembly, there are some tools that can't be spared.

Firstly, the most frequently-used too is cross screwdriver by which most interior components are fixed. A suitable screwdriver can make the following job much easier. Being so, does any screwdriver apply? Actually a magnetic tip one is suggested. That is because in the process of setting up your PC, the situation is very likely to happen: you accidentally drop the screws into the interior of the computer. In case of this, a magnetic screwdriver helps attracting the fallen screws that are hard to reach by hands. Some screw holes are placed where hands can hardly reach. At this time, we need a magnetic screwdriver, too. In addition, the size of our tool also matters. Generally, the **domestic 107 cross screwdriver** is the most appropriate one.

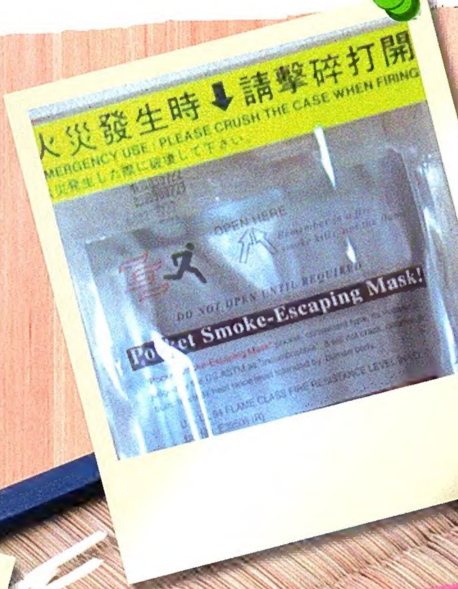
I can get it done!!



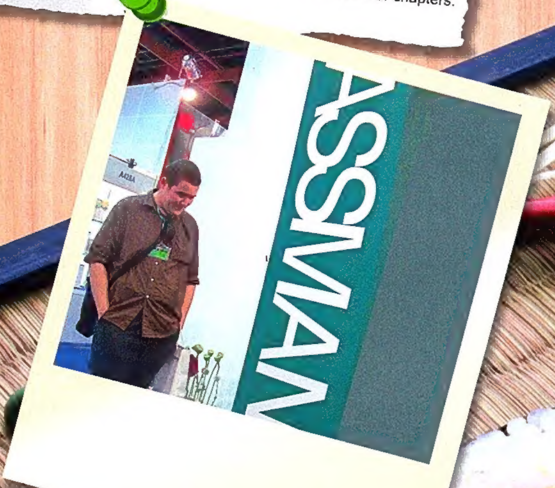
2

INTRODUCTION

This chapter provides the brief specification and function of each VGA card. For detailed description of all functions, you may refer to the rest of the chapters. Note that the VGA card you purchased may not cover all functions mentioned herein; therefore, it is recommended to read the "Reference" information first, which indexes the correspoding function description of each different VGA card, and then find the proper function description for your VGA card in the other chapters.



火災發生時⬇請擊碎打開
MERGENCY USE: PLEASE CRUSH THE CASE WHEN FIRING
OPEN HERE
DO NOT OPEN UNTIL REQUIRED
Po et Smoke-Escaping Mask!



# Thigummybobs and whoosiewhats

Maurice 'Moz' Ford ponders the perfunctory nature of jargon.

If you are reading this article there is a fair chance that you have, at some stage in your life, fixed a friend's computer. Some of you may even be lucky enough to work on a help desk. As such, you will be familiar with the frustration of explaining something complex to a person who finds burning a CD challenging.

But while you may not understand how anyone could be so uneducated, there is a similar reaction going on in the other person's brain too – that's right, n00bs don't understand *you* either.

To the unwashed masses, you are a modern day enigma. A magic wielder. A bloke wearing a furry overcoat and high heels in the park. A witch. They all thank you for fixing their PCs, but behind their nervously darting eyes, they fear you.

And that's bad. For fear leads to hate. Hate leads to anger. Anger leads to suffering and suffering leads to… well something. A nasty rash probably. You get my drift anyway.

They fear you because they have absolutely no idea what you are talking about. Presented with the phrase 'The frontside bus of a processor determines its speed' your average non-techy person will nod knowingly, uttering the ubiquitous 'Yes; yes, I see'. Meanwhile, they are in a panic, wondering what on earth you could possibly determine from putting their PC sideways in front of a speeding Greyhound coach.

The problem is *jargon*, that delightful profession-specific secret language that can only be spoken by those in the know.

Other vocations have suffered similarly misunderstood fates through the ages. Surveyors, for instance, have long been cursed by all who have need of their services and have often been burned at the stake – the basis for their extremely complex science involves liberal doses of trigonometry, astronomy, probabilities and logic. Any 'shop talk' sounds like black magic.

In response, surveyors came up with a hitherto unique method of explaining their activities to the masses. Quite simply, they took all the big words and dumbed them down. Gone were references to meridian, Bowditch adjustments and theodolites. Instead words such as 'jigger' and 'thingo' became the norm.

You can see the benefits immediately. Not only are we using very common terms (especially among the more forgetful of our community) but these key words have multiple meanings and uses!

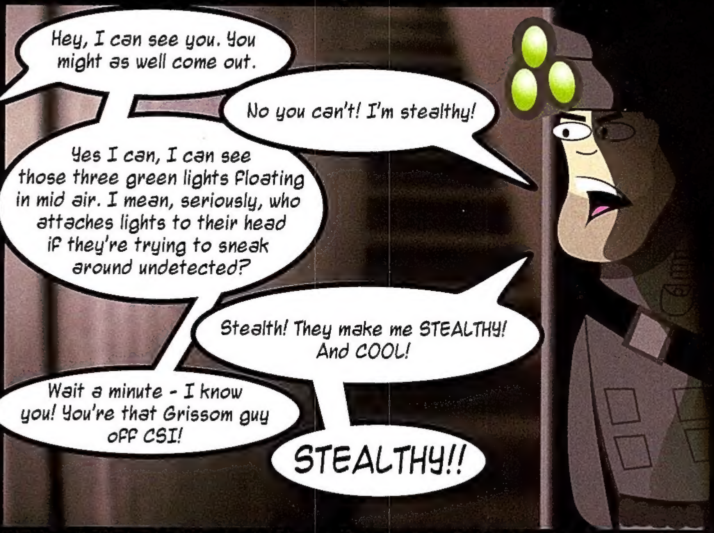
Such a language adopted for use in the computer trade could revolutionise the industry. Imagine the consequences…

Help desk personnel wouldn't feel like strangling every caller. The IT minister would know what he was talking about for once.

Bill Gates would make sense.

And best of all, the mob that is growing outside your window as you read this, well, they'll find someone else to tar and feather.

## Crashtest #16 - "Illogical Game Design Decisions and Sam Fisher"


Hey, I can see you. You might as well come out.
No you can't! I'm stealthy!
Yes I can, I can see those three green lights floating in mid air. I mean, seriously, who attaches lights to their head if they're trying to sneak around undetected?
Stealth! They make me STEALTHY! And COOL!
Wait a minute - I know you! You're that Grissom guy off CSI!
STEALTHY!!

Written & Illustrated by Craig Simms. © Copyright 2004 Atomic: Maximum Power Computing

## atomican

Winter's chill is perfect for squeezing extra cycles out of overclocked and abused silicon. So why are so many Atomicans apparently out and about?

Take Goth, TheAce, Sneddo, Cummings, Devil55, Vodka-mv and the rest of the Melbourne crew. They *could* have been cuddling up to their toasty PCs, but instead of raising CPU temps they've been raising glasses at Khruschev's Beer-a-thon Rev 6.

Cisco was wired before she even arrived at the event. Check out the photos of her chainmail (and other photos more suited to blackmail) at www.atomicmpc.com.au/forums.asp?s=1&c=5&t=752&p=120.

Then there were Rybags, Chef, Juggalo Scrubb and a cadre of Canberran Atomicans. They *could* have spent the cold nights bunkered down benchmarking. But instead they kept busy planning to bash balls around bunkers, as part of Golf War II. Hear their 19th hole war stories at /forums.asp?s=1&c=5&t=721.

In the warmer climes of Sydney LadyDeath, VannA, Demented Freak, Mills, BenjaminB, Lancer2K, Ghost Dog, Keivan and a host of other weekend warriors have decided they'd rather paintball than paint their cases. It remains to be seen whether their 1337 Call of Duty and Battlefield 1942 skillz translate to the real world, but new recruits can sign up for the splatterfest at /forums.asp?s=1&c=5&t=726&p=0.

Perhaps it's their experience keeping system temps down, but when it comes to winter it seems Atomicans certainly know how to chill.

**Virt**

## POTM 43

**How to remove browser hijacks, viruses and spyware**

www.atomicmpc.com.au/forums.asp?s=2&c=8&t=9372

By CokeMan

Good help is so hard to find these days. Unless you hang out at *Atomic*.

CokeMan posted this tidy guide to cleaning your PC of the spies, and keeping it that way. It's good, and it serves well as a wake-up call for those who may think their PC is free of nasties.

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